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SITE SERVICING AND STORMWATER MANAGEMENT REPORT

FOR

CAIVAN GREENBANK NORTH INC.
3713 BORRISOKANE ROAD

CITY OF OTTAWA

PROJECT NO.: 19-1134

JANUARY 2020 – REV. 1

SITE SERVICING AND STORMWATER MANAGEMENT REPORT
FOR
3713 BORRISOKANE ROAD

CAIVAN GREENBANK NORTH INC.

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1.0 INTRODUCTION

David Schaeffer Engineering Limited (DSEL) has been retained by Caivan Greenbank North Inc. to prepare a Site Servicing and Stormwater Management report in support of the application for Site Plan Control (SPC) at 3713 Borrisokane Road.

The subject property is located within the City of Ottawa, Rideau-Goulbourn Ward. As illustrated in ***Figure 1***, the subject property is located approximately 500 m south of the intersection of Borrisokane Road and Cambrian Road. Comprised of a single parcel of land, the subject property measures approximately ***31.5 ha*** and is zoned Mineral Extraction.

Figure 1: Site Location

The proposed SPC would allow for the development of a 1-storey assembly plant and a 2-storey administration building. The above ground parking areas will have access from both Borrisokane Road and the future roadway located south of the subject site. The proposed development will include a ***9365 m²*** assembly plant and ***2945 m²*** administration building. The proposed development occupies ***7.86 ha*** of the subject site. A copy of the Site Plan is included in ***Drawings/Figures***.

The objective of this report is to provide sufficient detail to demonstrate that the proposed development is supported by the future municipal services specified within City Application No. D07-16-18-0011 (***The Ridge Servicing Design***).

1.1 Existing Conditions

The existing site includes a rock quarry with vegetated areas. The elevations range between 110.82 m and 99.60 m, with a minimal grade change of approximately 0.50% from the Northwest to the Southeast corner of the property.

Sewer and watermain layout, collected from ***The Ridge Servicing Design***, indicates that the following services will exist within the future municipal right-of-ways:

Future Roadway (South of Subject Site)

- 300 mm diameter PVC watermain;
- 200 mm diameter PVC sanitary sewer tributary to the trunk sewer within Cambrian Road; and
- 1500 mm diameter concrete storm sewer tributary to the Drummond Pond.

Refer to ***Road Connection*** included in Drawings/Figures and drawing ***EX-1***, accompanying this report, for further details.

1.2 Required Permits / Approvals

The proposed development is subject to the site plan control approval process. The City of Ottawa must approve the engineering design drawings and reports prior to the issuance of site plan control.

Ontario Water Resources Act (OWRA) s.53 approval will be required from the Ministry of the Environment, Conservation and Parks (MECP) for stormwater discharge to the future Drummond stormwater management pond and this approval falls under the Transfer of Review process through the City of Ottawa.

The Environmental Compliance Approval (ECA) review process for Transfer of Review can take several months after the City of Ottawa approves the engineering submission and provides concurrence for site plan control.

1.3 Pre-consultation

Pre-consultation correspondence, along with the servicing guidelines checklist, is located in ***Appendix A***.

2.0 GUIDELINES, PREVIOUS STUDIES, AND REPORTS

2.1 Existing Studies, Guidelines, and Reports

The following studies were utilized in the preparation of this report:

- **Ottawa Sewer Design Guidelines**,
  City of Ottawa, *SDG002,* October 2012.
  (City Standards)
  - **Technical Bulletin ISTB-2018-01**
    City of Ottawa, March 21, 2018.
    (*ISTB-2018-01*)
  - **Technical Bulletin ISTB-2018-03**
    City of Ottawa, March 21, 2018.
    (*ISTB-2018-03*)
- **Ottawa Design Guidelines – Water Distribution**
  City of Ottawa, July 2010.
  (Water Supply Guidelines)
  - **Technical Bulletin ISD-2010-2**
    City of Ottawa, December 15, 2010.
    (*ISD-2010-2*)
  - **Technical Bulletin ISDTB-2014-02**
    City of Ottawa, May 27, 2014.
    (*ISDTB-2014-02*)
  - **Technical Bulletin ISDTB-2018-02**
    City of Ottawa, March 21, 2018.
    (*ISDTB-2018-02*)
- **Design Guidelines for Sewage Works,**
  Ministry of the Environment, 2008.
  (MOE* Design Guidelines*)
- **Stormwater Planning and Design Manual,**
  Ministry of the Environment, March 2003.
  (SWMP Design Manual)
- **Ontario Building Code Compendium**
  Ministry of Municipal Affairs and Housing Building Development Branch, January 1, 2010 Update.
  (OBC)

- **Design Brief for The Ridge (Brazeau Lands)**
  David Schaeffer Engineering Ltd., 18-1030, Rev. 1, October 4, 2019.
  (The Ridge Servicing Design)

- **Geotechnical Investigation**
  Paterson Group, PG5155-1, Rev. 1, December 3, 2019.
  (Geotechnical Report)

- **Master Servicing Study – Barrhaven South Urban Expansion Area**
  J.L. Richards & Associates Limited, Revision 2, May 2018.
  (BSUEA MSS)

3.0 WATER SUPPLY SERVICING

3.1 Existing Water Supply Services

The subject property lies within the City of Ottawa BARR pressure zone, as shown by the Pressure Zone map in ***Appendix B***. As per ***The Ridge Servicing Design***, a 300 mm diameter watermain is proposed within the future roadway right-of-way, located south of the development. There are currently no hydrants located within the vicinity of the site. Refer to ***Road Connection*** included in ***Drawings/Figures*** and drawing ***EX-1,*** accompanying this report, for further details.

3.2 Water Supply Servicing Design

It is proposed to service the development by connecting to the 300 mm diameter watermain within the future roadway, located south of the subject site, via a 200 mm diameter service connection. Two fire hydrants are proposed within the subject site. Refer to drawing ***SSP-1*** for a detailed servicing layout.

Table 1, below, summarizes the ***Water Supply Guidelines*** employed in the preparation of the preliminary water demand estimate.

Table 1
Water Supply Design Criteria

Design Parameter	Value
Water Closets & Lavatories	150 L/fixture/hour
Sinks & Drinking Fountains	375 L/fixture/hour
Showers	575 L/fixture/hour
Industrial – Light	35,000 L/gross ha/d
Industrial Maximum Daily Demand	1.5 x avg. day
Industrial Maximum Hour Demand	1.8 x max. day
Minimum Watermain Size	150 mm diameter
Minimum Depth of Cover	2.4 m from top of watermain to finished grade
During normal operating conditions desired operating pressure is within	350 kPa and 480 kPa
During normal operating conditions pressure must not drop below	275 kPa
During normal operating conditions pressure must not exceed	552 kPa
During fire flow operating pressure must not drop below	140 kPa
Daily average based on Appendix 4-A from **Water Supply Guidelines* *** Residential Max. Daily and Max. Hourly peaking factors per MOE Guidelines for Drinking-Water Systems Table 3-3 for 0 to 500 persons.* *-Table updated to reflect ISD-2010-2*	

Table 2, below, summarizes the estimated water supply demand and boundary conditions for the proposed development based on the ***Water Supply Guidelines***.

Table 2
Water Demand and Boundary Conditions
Proposed Conditions

Design Parameter	Anticipated Demand[1] (L/min)	Boundary Condition[2] (m H_2O / kPa)	
Average Daily Demand	108.0	147.7	420.8
Max Day + Fire Flow	163.4 + 3,725 = 3,888.4	138.6	331.6
Peak Hour	294.0	142.6	370.8

1) Water demand calculation per ***Water Supply Guidelines***. See ***Appendix B*** for detailed calculations.
2) Boundary conditions supplied by the City of Ottawa for the demands indicated in the correspondence; assumed ground elevation 104.8m. See ***Appendix B.***

Fire flow requirements are to be determined in accordance with City of Ottawa ***Water Supply Guidelines*** and the Ontario Building Code.

Based in correspondence with Lowe Fire Protection Inc., the fire flow demand was estimated as ***1,192.4 L/min*** (315 US gpm) for the administrative building and ***3,725 L/min*** (984 US gpm) for the assembly plant. Please refer to ***Appendix B*** for detailed calculations and correspondence with Lowe Fire Protection Inc.

In order to determine pressures for the development, ***The Ridge Servicing Design*** boundary condition results were used with the associated estimated water demand as indicated in the boundary request correspondence included in ***Appendix B***.

The City provided both the anticipated minimum and maximum water pressures, as well as, the estimated water pressure during fire flow demand for the demands indicated by the correspondence in ***Appendix B***. As shown by ***Table 2,*** above, the minimum and maximum pressures fall within the recommended range identified in ***Table 1***.

3.3 Water EPANet Model

EPANet was utilized to determine pipe sizing and the availability of pressures throughout the system during average day demand, max day plus fire flow, and peak hour demands. The static model determines pressures based on the available head obtained from the boundary conditions provided by the City of Ottawa, as indicated in ***Table 2***.

The model utilizes the Hazen-Williams equation to determine pressure drop, while the pipe properties, including friction factors, have been selected in accordance with Table 4.4 of the ***Water Supply Guidelines***. The model was prepared to assess the available pressure at the finished first floor of the administrative building, as well as, the pressures the watermain will provide to fire hydrants during fire flow conditions.

Table 3, below, summarizes the model results. ***Appendix B*** contains output reports and model schematics for each scenario.

Table 3
Model Simulation Output Summary

Location	Average Day (kPa)	Maximum Day + Fire Flow (kPa)	Peak Hour (kPa)
B1	462.0	310.3	411.5
B2	462.0	305.8	411.4
FH1	471.0	268.7	420.6
FH2	465.9	310.0	415.5
N1	476.9	351.9	426.5
N2	475.1	334.0	424.8
N3	473.6	322.0	423.2
N4	469.5	313.0	419.1
N5	466.4	310.2	415.9
N6	466.1	310.2	415.6

Results from modelling of the internal watermain indicate pressures will be within allowable pressure ranges at all points within the system.

3.4 Water Supply Conclusion

In order to determine pressures for the development, ***The Ridge Servicing Design*** boundary condition results were used with the associated estimated water demand.

Based on the EPANET model, demands fall within the recommended pressure range specified in the ***Water Supply Guidelines***. Results from modelling of the internal watermain indicate pressures will be within allowable pressure ranges at all points within the system.

The proposed water supply design conforms to all relevant City Guidelines and Policies.

4.0 WASTEWATER SERVICING

4.1 Existing Wastewater Services

The subject site will lie within the Cambrian Road trunk collection area. As per ***The Ridge Servicing Design,*** a 200 mm diameter sanitary sewer is proposed within the future roadway located south of the subject site. It is assumed that the future sanitary sewer fronting the subject site will be available to service the proposed development at the time of construction. Refer to ***Road Connection*** included in ***Drawings/Figures*** and drawing ***EX-1,*** accompanying this report, for further details.

4.2 Wastewater Design

It is proposed that the development will be serviced via the 200 mm diameter sanitary sewer within the future roadway via a network of 200 mm diameter sanitary sewers. Refer to drawing ***SSP-1***, accompanying this report, for sanitary servicing layout and connection points.

Table 3, below***,*** summarizes the ***City Standards*** employed in the design of the proposed wastewater sewer system.

Table 4
Wastewater Design Criteria

Design Parameter	Value
Water Closets*	150.0 L/fixture/hour
Lavatories*	150.0 L/fixture/hour
Kitchen Sinks	375 L/fixture/day
Showers*	575 L/fixture/hour
Mop Sink	375 L/fixture/day
Drinking Fountains*	375 L/fixture/day
Infiltration and Inflow Allowance	0.05 L/s/ha (Dry Weather) 0.28 L/s/ha (Wet Weather) 0.33 L/s/ha (Total)
Industrial - Light	35,000 L/gross ha/d
Industrial Peaking Factor	4.4 per City of Ottawa Sewer Design Guidelines Appendix 4B
Sanitary sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} AR^{2/3} S^{1/2}$
Minimum Sewer Size	200 mm diameter
Minimum Manning's 'n'	0.013
Minimum Depth of Cover	2.5 m from crown of sewer to grade
Minimum Full Flowing Velocity	0.6 m/s
Maximum Full Flowing Velocity	3.0 m/s
Extracted from Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines, October 2012. **assuming a 12 hour commercial operation*	

Table 4, below, demonstrates the estimated peak flow from the proposed development. See ***Appendix C*** for associated calculations.

Table 5
Summary of Estimated Peak Wastewater Flow

Design Parameter	Total Flow (L/s)
Estimated Average Dry Weather Flow	2.21
Estimated Peak Dry Weather Flow	3.57
Estimated Peak Wet Weather Flow	5.77

The estimated sanitary flow based on the ***Site Plan,*** included in ***Drawings/Figures,*** results in a peak wet weather flow of ***5.77 L/s***.

In order to assess the available capacity, a sanitary analysis was conducted for the local future sanitary sewers to be located across the frontage of the subject property. The analysis was conducted from the site to the 375 mm diameter sewer within Street P, as shown by the sanitary drainage plan included in ***Appendix C***.

Based on the sanitary analysis, the controlling section of the local sewer system will be located between future sanitary manholes MH134A and MH135A, at the intersection of the future roadway connection and Street P. It is estimated that the available residual capacity of the controlling leg of sewer is ***9.44 L/s***; detailed calculations are included in ***Appendix C***.

The analysis above indicates that sufficient capacity will be available in the local sewers to accommodate the proposed development.

4.3 Wastewater Servicing Conclusions

The site will be tributary to the Cambrian Road trunk collection area. It is proposed to discharge wastewater to the 200 mm diameter sanitary sewer within the future roadway located south of the subject site, via a network of 200 mm diameter sanitary sewers. It is assumed that the future sanitary sewer fronting the subject site will be available to service the proposed development at the time of construction.

Based on the above sanitary analysis, there will be sufficient capacity available to accommodate the estimated ***5.77 L/s*** peak wet weather flow from the proposed development.

The proposed wastewater design conforms to all relevant ***City Standards***.

5.0 STORMWATER MANAGEMENT

5.1 Existing Stormwater Services

In accordance with the ***BSUEA MSS***, stormwater runoff from the subject property is tributary to the City of Ottawa sewer system and is located within the Jock River sub-watershed. As such, approvals for proposed development within this area are under the approval authority of the City of Ottawa. Refer to ***Appendix D*** for the *BSUEA Extents, Drainage Divide and Culverts* figure included in the ***BSUEA MSS*** for an illustration of the local drainage boundaries.

A *Master Storm Drainage Plan* was prepared by J.L. Richards and was included in the ***BSUEA MSS***. As per the *Master Storm Drainage Plan*, the subject site is situated between the future Drummond Stormwater Management Pond (Drummond SWM Pond) and the Brazeau Stormwater Management Pond (Brazeau SWM Pond). Based on the existing topography of the site, stormwater runoff will be tributary to the Drummond SWM Pond, located north of the subject site. The Drummond SWM Pond is ultimately tributary to the Jock River, located approximately 1 km downstream. Refer to *Master Storm Drainage Plan*, included in ***Appendix D*****,** for further details.

Flows that influence the watershed in which the subject property is located are further reviewed by the principal authority. The subject property is located within the Jock River Subwatershed, and is subject to review by the Rideau Valley Conservation Authority (RVCA).

As per ***The Ridge Servicing Design,*** a 1500 mm diameter storm sewer is proposed within the future roadway located south of the subject site. It is assumed that the future storm sewer fronting the subject site will be available to service the proposed development at the time of construction. Refer to ***Road Connection*** included in ***Drawings/Figures*** and drawing ***EX-1,*** accompanying this report, for further details.

It was determined that the existing site contained no stormwater management controls for flow attenuation. The estimated pre-development peak flows for the 2, 5, and 100-year events are summarized in ***Table 6,*** below:

Table 6
Summary of Existing Peak Storm Flow Rates

City of Ottawa Design Storm	Estimated Peak Flow Rate (L/s)
2-year	155.5
5-year	209.3
100-year	445.2

5.2 Post-development Stormwater Management Target

Stormwater management requirements for the proposed development were reviewed with ***The Ridge Servicing Design*** (subject to separate City of Ottawa application D07-16-18-011), where the proposed development is required to:

- Meet the existing flow in the downstream system;
- Meet the quality control target of 80% TSS removal as per the Jock River Reach One Subwatershed Study (Stantec, 2007); and,
- Preserve pre-infiltration condition levels (Section 5.3.4 of ***BSUEA MSS***)

Relevant excerpts from ***The Ridge Servicing Design*** have been included in ***Appendix D*** for reference.

5.3 Proposed Stormwater Management System

It is proposed that stormwater runoff from the development will be captured and conveyed to the forebay of the Drummond SWM Pond, located north of the subject site. ***The Ridge Servicing Design*** (subject to separate City of Ottawa application D07-16-18-011), will be updated to reflect this. It should be noted that the Drummond SWM Pond depicted on the engineering drawings included with this submission has been sized to accept stormwater flows from the subject site.

The internal storm sewer network will convey stormwater to the Drummond SWM Pond via a 900 mm diameter storm sewer. Refer to drawing ***SSP-1***, accompanying this report, for a detailed servicing layout.

Uncontrolled areas, as shown by drawing ***STM-1,*** provided along with this report, will be released uncontrolled to municipal right-of-ways, but the proposed major system will outlet to the Drummond SWM Pond.

Refer to the stormwater calculations included in ***Appendix D*** and drawings ***SSP-1*** and ***STM-1*** for further details.

Runoff collected along the western side of the subject site (U1) will flow to overland towards the existing Borrisokane Road ditch. Once collected within the Borrisokane roadside ditch, stormwater will be conveyed approximately 1 km downstream towards the Jock River. Stormwater within this area is considered clean as it is collected within landscaped areas. Refer to drawing ***STM-1***, accompanying this report, for a detailed drainage plan.

Runoff collected along the southern side of the subject site (U2) will flow overland towards the future roadway roadside ditch. Once collected within the roadside ditch, stormwater will be directed towards the future 1500 mm diameter storm sewer and ultimately the Drummond SWM Pond. Stormwater within this area is considered clean as it is collected

within landscaped areas. Refer to drawing ***STM-1***, accompanying this report, for a detailed drainage plan.

Runoff collected along the northern side of the subject site (U3) will flow to overland towards the Drummond SWM Pond. Stormwater within this area is considered clean as it is collected within landscaped areas. Refer to drawing ***STM-1***, accompanying this report, for a detailed drainage plan.

5.4 Stormwater Servicing Conclusions

Post development stormwater runoff will be captured and directed to the forebay of the Drummond SWM Pond, which will be updated accordingly in ***The Ridge Servicing Design***. The Drummond SWM Pond depicted on the engineering drawings included with this submission has been sized to accept stormwater flows from the subject site.

As stormwater runoff for the proposed development will outlet directly to the forebay of the Drummond SWM Pond, no additional quality controls are required within the site.

The proposed stormwater design conforms to all relevant ***City Standards*** and Policies for approval.

6.0 UTILITIES

Utility servicing will be coordinated with the individual utility companies prior to site development.

7.0 EROSION AND SEDIMENT CONTROL

Soil erosion occurs naturally and is a function of soil type, climate and topography. During construction the extent of erosion losses is exaggerated due to the removal of vegetation and the top layer of soil becoming agitated.

Prior to topsoil stripping, earthworks or underground construction, erosion and sediment controls will be implemented and will be maintained throughout construction.

Silt fence will be installed around the perimeter of the site and will be cleaned and maintained throughout construction. Silt fence will remain in place until the working areas have been stabilized and re-vegetated.

Catch basins will have SILTSACKs or an approved equivalent installed under the grate during construction to protect from silt entering the storm sewer system.

A mud mat will be installed at the construction access in order to prevent mud tracking onto adjacent roads.

Erosion and sediment controls must be in place during construction. The following recommendations to the contractor will be included in contract documents:

- Limit extent of exposed soils at any given time;
- Re-vegetate exposed areas as soon as possible;
- Minimize the area to be cleared and grubbed;
- Protect exposed slopes with plastic or synthetic mulches;
- Install silt fence to prevent sediment from entering existing ditches;
- No refueling or cleaning of equipment near existing watercourses;
- Provide sediment traps and basins during dewatering;
- Install filter cloth between catch basins and frames;
- Plan construction at proper time to avoid flooding; and
- Establish material stockpiles away from watercourses, so that barriers and filters may be installed.

The contractor will, at every rainfall, complete inspections and guarantee proper performance. The inspection is to include:

- Verification that water is not flowing under silt barriers; and
- Clean and change filter cloth at catch basins.

8.0 CONCLUSION AND RECOMMENDATIONS

David Schaeffer Engineering Ltd. (DSEL) has been retained by Caivan Greenbank North Inc. to prepare a Site Servicing and Stormwater Management Report in support of the application for a Site Plan Control (SPC) at 3713 Borrisokane Road. The preceding report outlines the following:

- Based on boundary conditions included in ***Appendix B***, the existing municipal water infrastructure is capable of providing the development with water within the City's recommended pressure range;
- Based in correspondence with Lowe Fire Protection Inc., the fire flow demand was estimated as ***1,192.4 L/min*** (315 US gpm) for the administrative building and ***3,725 L/min*** (984 US gpm) for the assembly plant;
- The development is estimated to have a peak wet weather flow of ***5.77 L/s***; Based on the sanitary analysis conducted the existing municipal sewer infrastructure has sufficient capacity to support the development;
- The Drummond SWM Pond depicted on the engineering drawings included with this submission has been sized to accept stormwater flows from the subject site;
- Based on ***The Ridge Servicing Design***, the proposed development will be required to meet the existing flow in the downstream system and preserve pre-infiltration condition levels; and
- As stormwater runoff for the proposed development will outlet directly to the forebay of the Drummond SWM Pond, no additional quality controls are required within the site.

Prepared by,
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Per: Alison J. Gosling, EIT.

Reviewed by,
David Schaeffer Engineering Ltd.

Per: Jennifer Ailey, P.Eng.

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APPENDIX A

Pre-Consultation

DEVELOPMENT SERVICING STUDY CHECKLIST

19-1134 15/01/2020

4.1 General Content		
☐	Executive Summary (for larger reports only).	N/A
☒	Date and revision number of the report.	Report Cover Sheet
☒	Location map and plan showing municipal address, boundary, and layout of proposed development.	Drawings/Figures
☒	Plan showing the site and location of all existing services.	Figure 1
☒	Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	Section 1.0
☒	Summary of Pre-consultation Meetings with City and other approval agencies.	Section 1.3
☒	Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.	Section 2.1
☒	Statement of objectives and servicing criteria.	Section 1.0
☒	Identification of existing and proposed infrastructure available in the immediate area.	Sections 3.1, 4.1, 5.1
☐	Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	N/A
☒	Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	GP-1
☐	Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	N/A
☐	Proposed phasing of the development, if applicable.	N/A
☒	Reference to geotechnical studies and recommendations concerning servicing.	Section 1.4
☒	All preliminary and formal site plan submissions should have the following information: -Metric scale -North arrow (including construction North) -Key plan -Name and contact information of applicant and property owner -Property limits including bearings and dimensions -Existing and proposed structures and parking areas -Easements, road widening and rights-of-way -Adjacent street names	SSP-1

4.2 Development Servicing Report: Water		
☐	Confirm consistency with Master Servicing Study, if available	N/A
☒	Availability of public infrastructure to service proposed development	Section 3.1
☒	Identification of system constraints	Section 3.1
☒	Identify boundary conditions	Section 3.1, 3.2
☒	Confirmation of adequate domestic supply and pressure	Section 3.3

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

☒	Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.	Section 3.2
☐	Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.	N/A
☐	Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design	N/A
☐	Address reliability requirements such as appropriate location of shut-off valves	N/A
☐	Check on the necessity of a pressure zone boundary modification	N/A
☒	Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range	Section 3.2, 3.3
☐	Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.	N/A
☐	Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.	N/A
☒	Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Section 3.2
☐	Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	N/A

4.3 Development Servicing Report: Wastewater

☒	Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).	Section 4.2
☐	Confirm consistency with Master Servicing Study and/or justifications for deviations.	N/A
☐	Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.	N/A
☒	Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Section 4.1
☒	Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)	Section 4.2
☒	Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	Section 4.2, Appendix C
☒	Description of proposed sewer network including sewers, pumping stations, and forcemains.	Section 4.2
☐	Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	N/A

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

☐	Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	N/A
☐	Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	N/A
☐	Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	N/A
☐	Special considerations such as contamination, corrosive environment etc.	N/A

4.4 Development Servicing Report: Stormwater Checklist

☒	Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)	Section 5.1
☒	Analysis of available capacity in existing public infrastructure.	Section 5.1, Appendix D
☒	A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	Drawings/Figures
☒	Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.	Section 5.2
☒	Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	Section 5.2
☒	Description of the stormwater management concept with facility locations and descriptions with references and supporting information	Section 5.3
☐	Set-back from private sewage disposal systems.	N/A
☐	Watercourse and hazard lands setbacks.	N/A
☒	Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	Appendix A
☐	Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	N/A
☒	Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).	Section 5.3
☐	Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	N/A
☒	Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	Section 5.1, 5.3
☐	Any proposed diversion of drainage catchment areas from one outlet to another.	N/A
☐	Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	N/A
☐	If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.	N/A
☐	Identification of potential impacts to receiving watercourses	N/A
☐	Identification of municipal drains and related approval requirements.	N/A

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

☒	Descriptions of how the conveyance and storage capacity will be achieved for the development.	Section 5.3
☐	100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	N/A
☐	Inclusion of hydraulic analysis including hydraulic grade line elevations.	N/A
☒	Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Section 7.0
☐	Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	N/A
☐	Identification of fill constraints related to floodplain and geotechnical investigation.	N/A

4.5 Approval and Permit Requirements: Checklist

☒	Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement ct. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.	Section 1.2
☐	Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	N/A
☐	Changes to Municipal Drains.	N/A
☐	Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	N/A

4.6 Conclusion Checklist

☒	Clearly stated conclusions and recommendations	Section 8.0
☐	Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.	
☐	All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario	

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

APPENDIX B

Water Supply

3713 Borrisokane Road
Proposed Site Conditions

Water Demand Design Flows per Unit Count
City of Ottawa - Water Distribution Guidelines, July 2010

Domestic Demand

Institutional / Commercial / Industrial Demand

			Avg. Daily		Max Day		Peak Hour	
Property Type	**Unit Rate**	**Units**	**m^3/d**	**L/min**	**m^3/d**	**L/min**	**m^3/d**	**L/min**
Water Closets	150.0 L/fixture/hour	26	46.80	32.5	70.2	48.8	126.4	87.8
Lavatories	150.0 L/fixture/hour	22	39.60	27.5	59.4	41.3	106.9	74.3
Kitchen Sinks	375 L/fixture/day	2	0.75	0.5	1.1	0.8	2.0	1.4
Showers	575 L/fixture/hour	4	27.60	19.2	41.4	28.8	74.5	51.8
Mop Sink	375 L/fixture/day	1	0.38	0.3	0.6	0.4	1.0	0.7
Drinking Fountains	375 L/fixture/day	2	9.00	6.3	13.5	9.4	24.3	16.9
Industrial - Light	35,000 L/gross ha/d	0.93	32.69	22.7	49.0	34.1	88.3	61.3
Industrial - Heavy	55,000 L/gross ha/d	-	0.00	0.0	0.0	0.0	0.0	0.0
	Total I/CI Demand		156.8	108.9	235.2	163.4	423.4	294.0
	Total Demand		**156.8**	**108.9**	**235.2**	**163.4**	**423.4**	**294.0**

Minor Loss Coefficients

Fitting	Loss Coefficient
Globe valve, fully open	10
Angle valve, fully open	5
Swing check valve, fully open	2.5
Gate valve, fully open	0.2
Short-radius elbow	0.9
Medium-radius elbow	0.8
Long-radius elbow	0.6
45 degree elbow	0.4
Closed return bend	2.2
Standard tee - flow through	0.6
Standard tee - flow through	1.8
Square Entrance	0.5
Exit	1

*Minor loss coefficients based on EPANET 2 USERS MANUAL, dated September 2000

Pipe Diameter vs. "C" Factor

Pipe Diameter (m)	C-Factor
150	100
200 to 250	110
300 to 600	120
Over 600	130

Node Pressures

Kpa	Pressure (kPa)	Pressure (m H20)
Max	552	56.3
Rec Max	480	49.0
Rec Min	350	35.7
Min	275	28.1

Location	Average Day (kPa)	Max Day + Fire Flow (Fire Flow at Critical Node) (kPa)	Max Day + Fire Flow (Fire Flow at Node) (kPa)	Peak Hour (kPa)
FH1	48.0	0.0	268.7	0.0
FH2	47.5	0.0	273.1	0.0

Location	Average Day (kPa)	Max Day + Fire Flow (kPa)	Peak Hour (kPa)
B1	462.0	310.3	411.5
B2	462.0	305.8	411.4
FH1	471.0	268.7	420.6
FH2	465.9	310.0	415.5
N1	476.9	351.9	426.5
N2	475.1	334.0	424.8
N3	473.6	322.0	423.2
N4	469.5	313.0	419.1
N5	466.4	310.2	415.9
N6	466.1	310.2	415.6

Adjusted Pressures at Building FFE

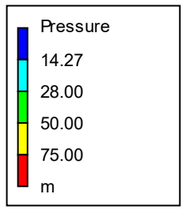
Location	Average Day (kPa)	Max Day + Fire Flow (kPa)	Peak Hour (kPa)
B1	438.0	286.5	387.6
B2	438.0	281.9	387.5

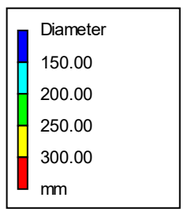
Boundary Conditions Unit Conversion (Dundonald Drive)

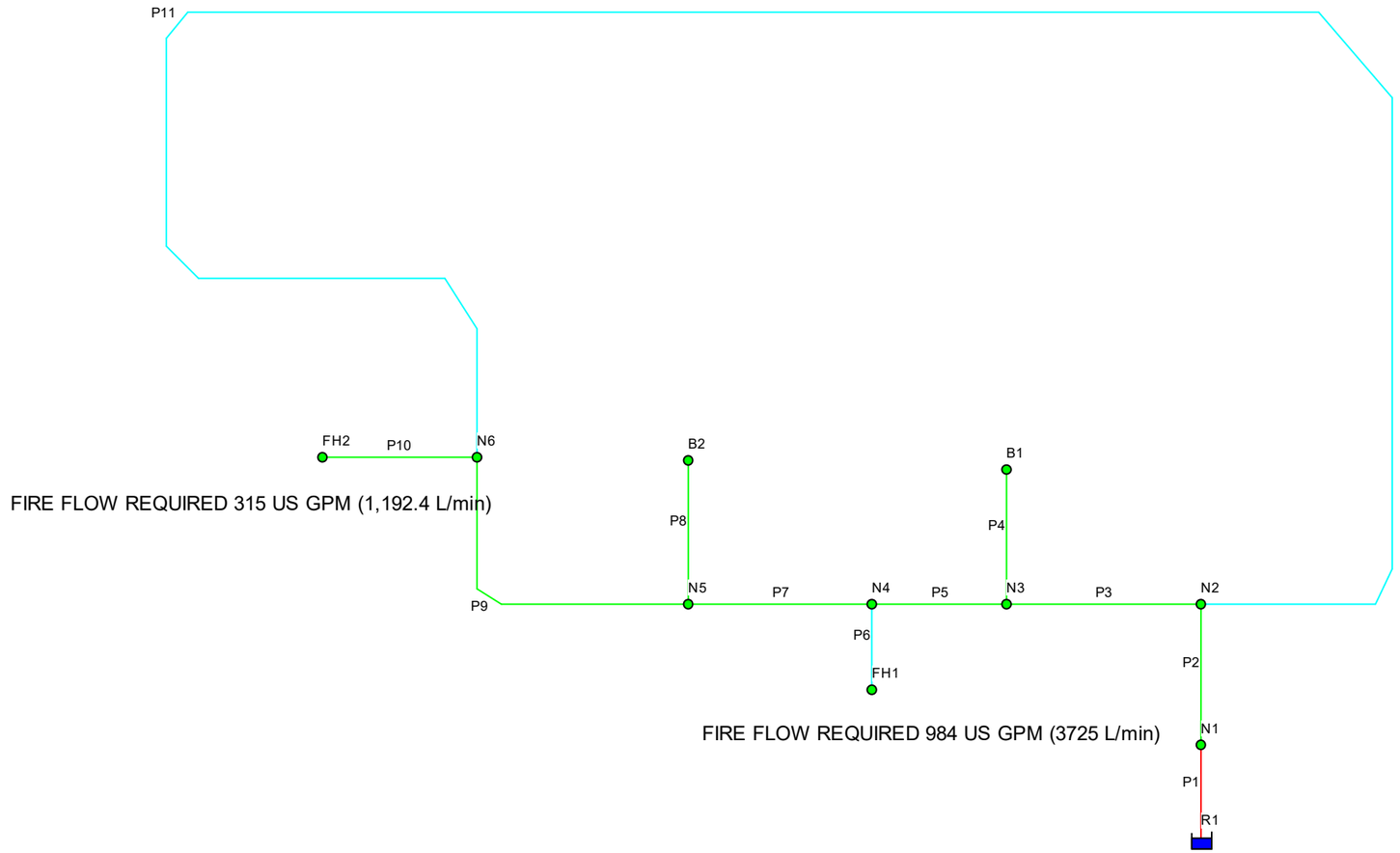
Grnd Elev	104.8		
	m H_2O	**PSI**	**kPa**
Avg. Day	**147.7**	61.0	420.8
Peak Hour	**138.6**	48.1	331.6
Max Day + FF	**142.6**	53.8	370.8

3713 BORRISOKANE ROAD - AVERAGE DAY DEMAND

Day 1, 12:00 AM







SUBDIVISION BOUNDARY CONDITIONS

MHD 147.7 m

PHD 142.6 m

MXD FF (10,000 L/min) 138.6 m

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******************************************************************
*                          E P A N E T                           *
*                   Hydraulic and Water Quality                  *
*                   Analysis for Pipe Networks                   *
*                         Version 2.0                            *
******************************************************************

Input File: 2019-11-26_1134_Average.net
```

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
P1	N1	R1	869.18	300
P2	N1	N2	42.91	200
P3	N3	N2	34.7	200
P4	N3	B1	16.7	200
P5	N4	N3	18.77	200
P6	N4	FH1	7.55	150
P7	N5	N4	79.15	200
P8	B2	N5	24.09	200
P9	N6	N5	54.89	200
P10	FH2	N6	6.95	200
P11	N6	N2	570.18	150

Node Results:

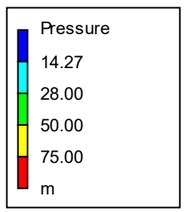
Node ID	Demand LPM	Head m	Pressure m	Quality	
N1	0.00	147.70	48.61	0.00	
N2	0.00	147.69	48.43	0.00	
N3	0.00	147.69	48.28	0.00	
B1	54.45	147.69	47.09	0.00	
N4	0.00	147.69	47.86	0.00	
FH1	0.00	147.69	48.01	0.00	
N5	0.00	147.69	47.54	0.00	
B2	54.45	147.69	47.09	0.00	
N6	0.00	147.69	47.51	0.00	
FH2	0.00	147.69	47.49	0.00	
R1	-108.90	147.70	0.00	0.00	Reservoir

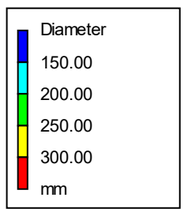
Link Results:

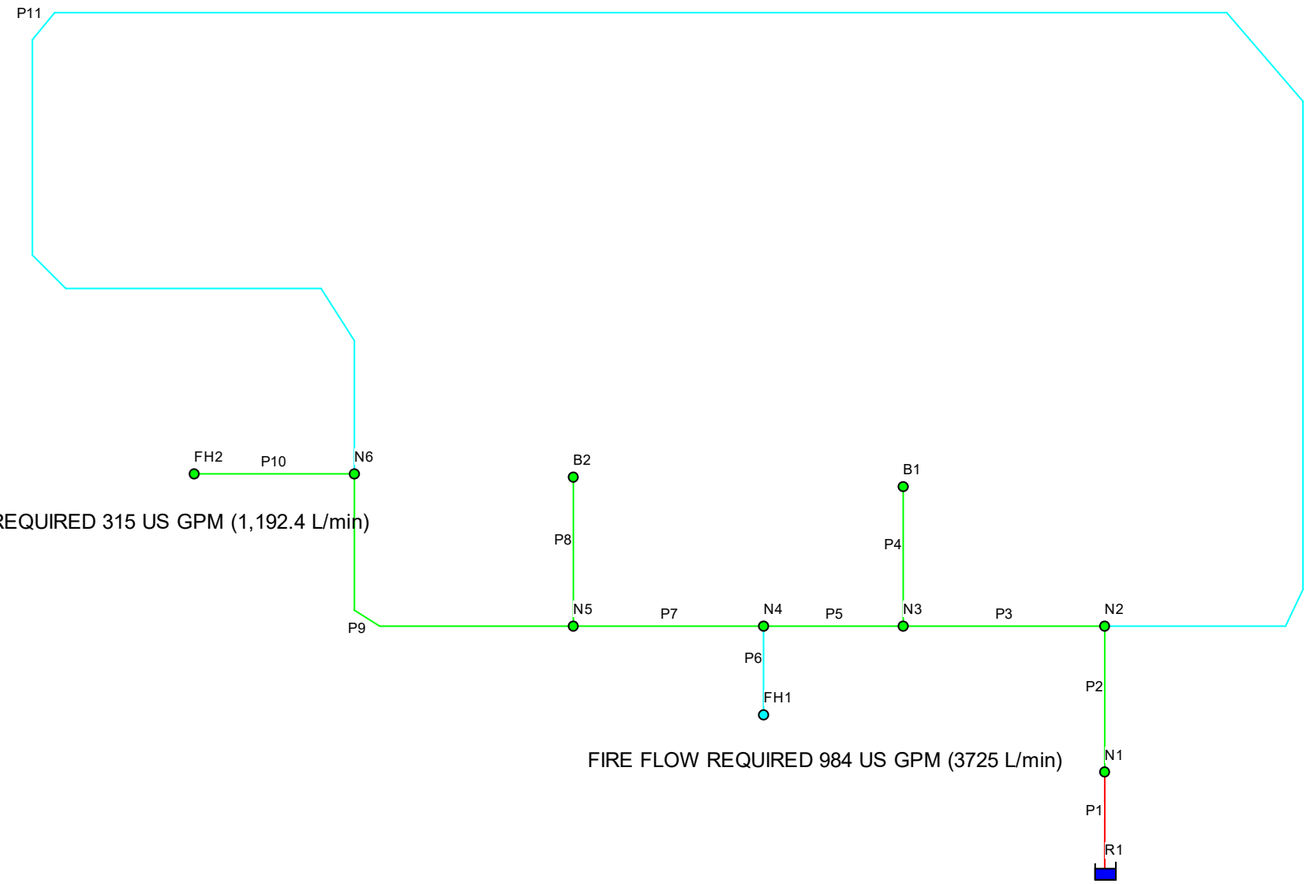
Link ID	Flow LPM	VelocityUnit m/s	Headloss m/km	Status
P1	-108.90	0.03	0.01	Open
P2	108.90	0.06	0.05	Open
P3	-96.37	0.05	0.04	Open
P4	54.45	0.03	0.02	Open
P5	-41.92	0.02	0.01	Open
P6	0.00	0.00	0.00	Open
P7	-41.92	0.02	0.01	Open
P8	-54.45	0.03	0.02	Open
P9	12.53	0.01	0.00	Open
P10	0.00	0.00	0.00	Open
P11	-12.53	0.01	0.00	Open

3713 BORRISOKANE ROAD - MAXDAY + FIRE FLOW DEMAND FH1

Day 1, 12:00 AM







SUBDIVISION BOUNDARY CONDITIONS

MHD 147.7 m

PHD 142.6 m

MXD FF (10,000 L/min) 138.6 m

```
*************************************************************
*                          E P A N E T                      *
*                  Hydraulic and Water Quality              *
*                  Analysis for Pipe Networks               *
*                        Version 2.0                        *
*************************************************************

Input File: 2019-11-26_1134_Fire-Flow2.net
```

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
P1	N1	R1	869.18	300
P2	N1	N2	42.91	200
P3	N3	N2	34.7	200
P4	N3	B1	16.7	200
P5	N4	N3	18.77	200
P6	N4	FH1	7.55	150
P7	N5	N4	79.15	200
P8	B2	N5	24.09	200
P9	N6	N5	54.89	200
P10	FH2	N6	6.95	200
P11	N6	N2	570.18	150

Node Results:

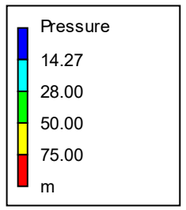
Node ID	Demand LPM	Head m	Pressure m	Quality	
N1	0.00	134.96	35.87	0.00	
N2	0.00	133.31	34.05	0.00	
N3	0.00	132.23	32.82	0.00	
B1	81.70	132.23	31.63	0.00	
N4	0.00	131.74	31.91	0.00	
FH1	3725.00	127.07	27.39	0.00	
N5	0.00	131.77	31.62	0.00	
B2	81.70	131.77	31.17	0.00	
N6	0.00	131.80	31.62	0.00	
FH2	0.00	131.80	31.60	0.00	
R1	-3888.40	138.60	0.00	0.00	Reservoir

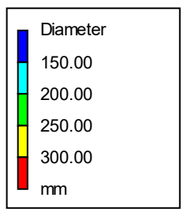
Link Results:

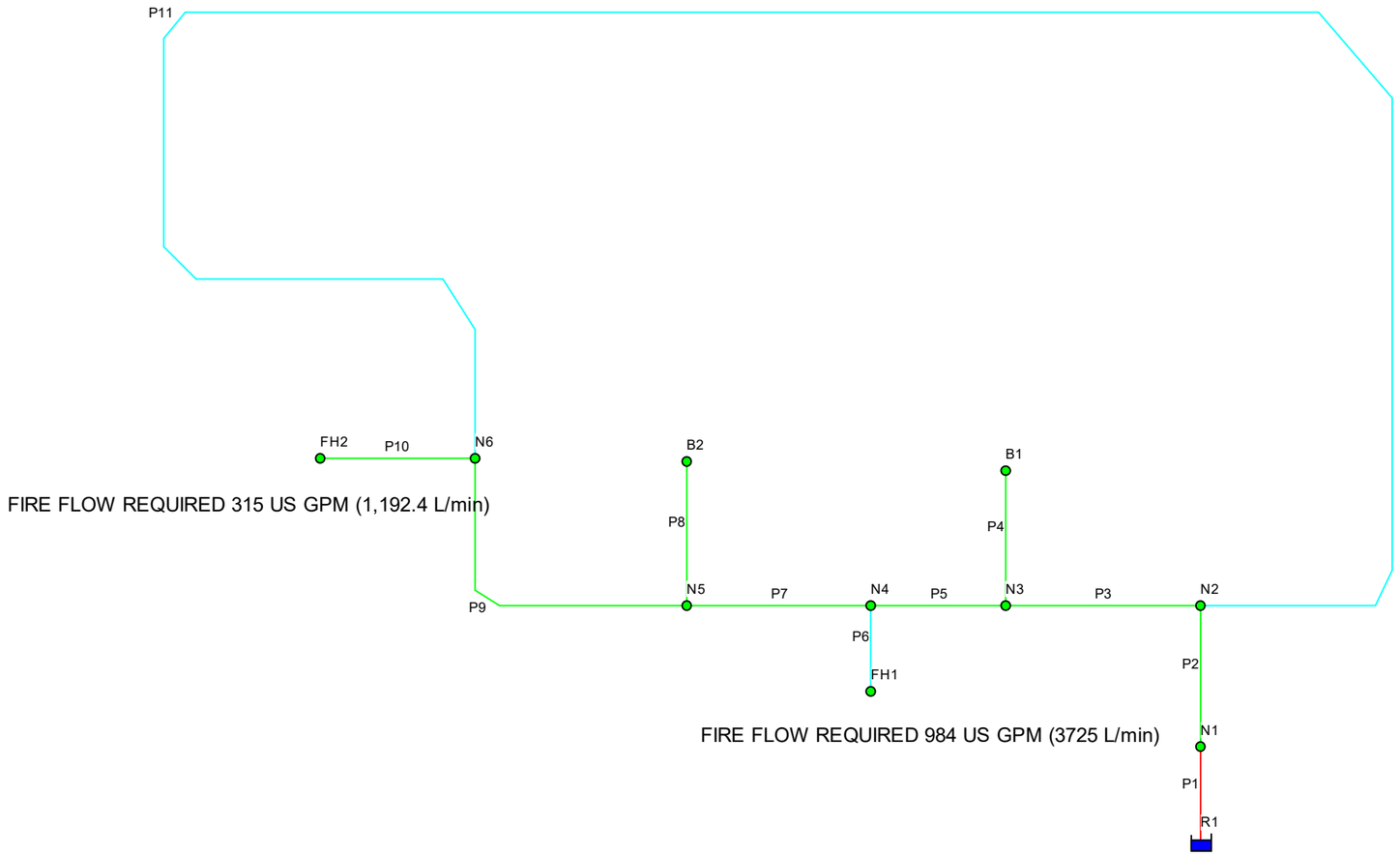
Link ID	Flow LPM	VelocityUnit m/s	Headloss m/km	Status
P1	-3888.40	0.92	4.19	Open
P2	3888.40	2.06	38.36	Open
P3	-3427.17	1.82	31.10	Open
P4	81.70	0.04	0.03	Open
P5	-3345.47	1.77	26.52	Open
P6	3725.00	3.51	617.76	Open
P7	379.53	0.20	0.40	Open
P8	-81.70	0.04	0.03	Open
P9	461.23	0.24	0.62	Open
P10	0.00	0.00	0.00	Open
P11	-461.23	0.44	2.65	Open

3713 BORRISOKANE ROAD - PEAK HOUR DEMAND

Day 1, 12:00 AM







SUBDIVISION BOUNDARY CONDITIONS

MHD 147.7 m

PHD 142.6 m

MXD FF (10,000 L/min) 138.6 m

```
******************************************************************
*                          E P A N E T                           *
*                   Hydraulic and Water Quality                  *
*                   Analysis for Pipe Networks                   *
*                        Version 2.0                             *
******************************************************************

Input File: 2019-11-26_1134_Peak.net
```

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
P1	N1	R1	869.18	300
P2	N1	N2	42.91	200
P3	N3	N2	34.7	200
P4	N3	B1	16.7	200
P5	N4	N3	18.77	200
P6	N4	FH1	7.55	150
P7	N5	N4	79.15	200
P8	B2	N5	24.09	200
P9	N6	N5	54.89	200
P10	FH2	N6	6.95	200
P11	N6	N2	570.18	150

Node Results:

Node ID	Demand LPM	Head m	Pressure m	Quality	
N1	0.00	142.57	43.48	0.00	
N2	0.00	142.56	43.30	0.00	
N3	0.00	142.55	43.14	0.00	
B1	147.00	142.55	41.95	0.00	
N4	0.00	142.55	42.72	0.00	
FH1	0.00	142.55	42.87	0.00	
N5	0.00	142.55	42.40	0.00	
B2	147.00	142.54	41.94	0.00	
N6	0.00	142.55	42.37	0.00	
FH2	0.00	142.55	42.35	0.00	
R1	-294.00	142.60	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPM	VelocityUnit m/s	Headloss m/km	Status
P1	-294.00	0.07	0.03	Open
P2	294.00	0.16	0.29	Open
P3	-259.85	0.14	0.24	Open
P4	147.00	0.08	0.10	Open
P5	-112.85	0.06	0.05	Open
P6	0.00	0.00	0.00	Open
P7	-112.85	0.06	0.04	Open
P8	-147.00	0.08	0.10	Open
P9	34.15	0.02	0.00	Open
P10	0.00	0.00	0.00	Open
P11	-34.15	0.03	0.02	Open

LOWE FIRE PROTECTION INC.

Raymond Tanguay
101-2435 Holly Lane
Ottawa, Ontario K1V 7P2

Telephone (613) 739-5693 (739-LOWE)
Fax (613) 739-2922

B.B.S. Construction (Ontario) Ltd. November 19, 2019

Attention: Pete Van Grootheest

Re: Fire Protection Installation
1944 ABIC Admin Offices & Assembly Plant
Ottawa, Ontario

Dear Sirs:

We are pleased to offer the following fire sprinkler system flow calculations for your use.

1) The Administration building:
   Light Hazard Occupancy
   Sprinkler system density requirement:
   0.10 usgpm/sq ft over 1500 sq ft = 150 usgpm
   10% Sprinkler system overage = 15 usgpm
   Inside and outside hoses = 150 usgpm
   Total Admin Building Demand = 315 usgpm

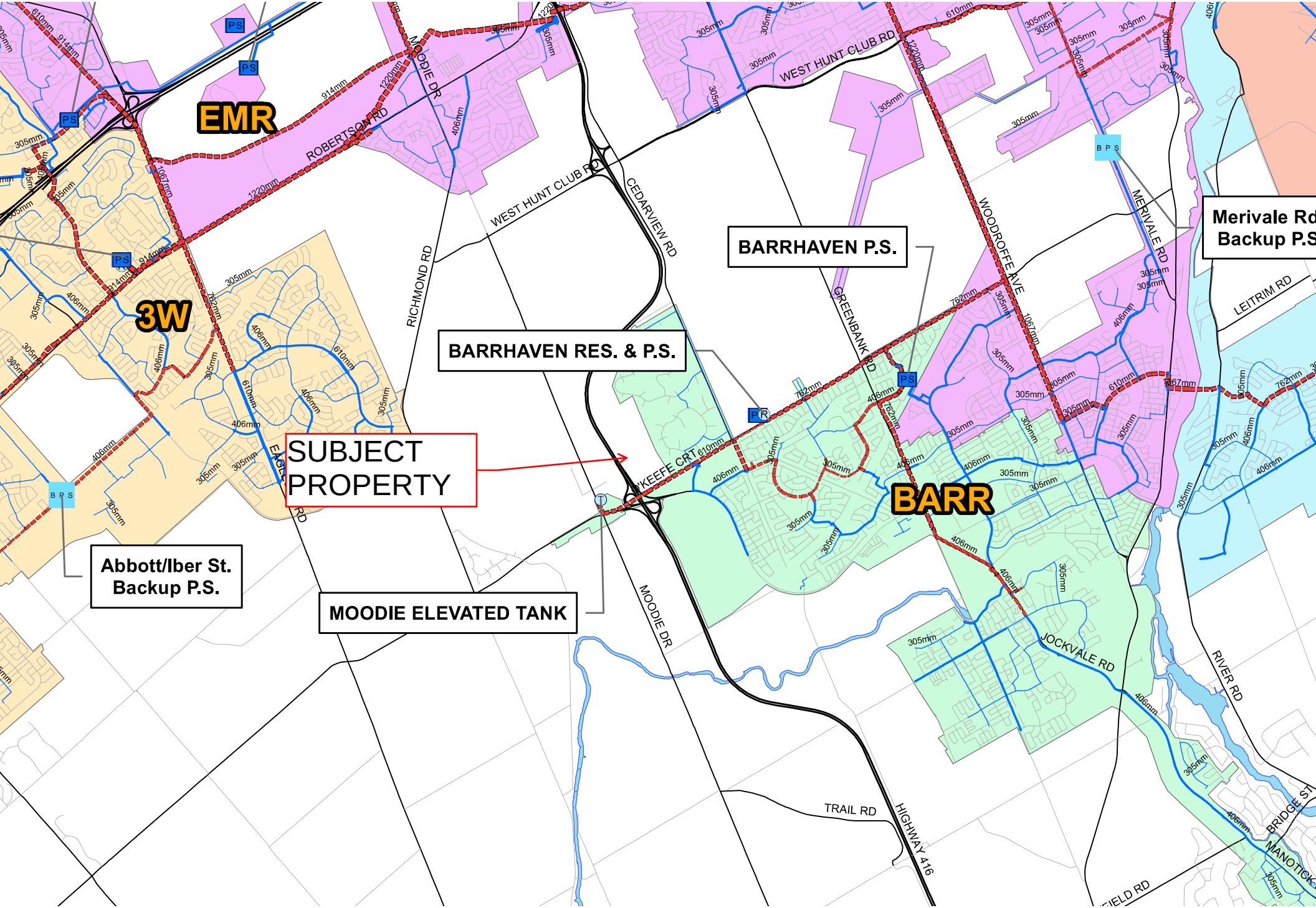
2) The Assembly Plant:
   The outdoor storage is the highest density requirement:
   0.40 usgpm/sq ft over 100 sq ft per sprinkler x 11 sprinklers = 440 usgpm
   10% Sprinkler system overage = 44 usgpm
   Inside and outside hoses = 500 usgpm
   Total Assembly Building Demand = 984 usgpm

We trust that the above calculations are satisfactory, should you have any questions please do not hesitate to ask.

Yours Truly,
Lowe Fire Protection Inc.

Raymond Tanguay

City of Ottawa - Water Distribution System



Design Brief for Caivan Communities
The Ridge (Brazeau Lands)
David Schaeffer Engineering Ltd.

DSEL No. 18-1030
October 4, 2019 Rev1

Charlotte Kelly

From: Shillington, Jeffrey <jeff.shillington@ottawa.ca>
Sent: October 3, 2019 8:44 AM
To: Anthony Temelini; Kevin Murphy
Subject: FW: Bc for the Meadows - Phase 7/8 and Brazeau
Attachments: HMB5_Brazeau_Boundary Conditions_April262017.docx

Anthony/Kevin,

Please see the boundary conditions for the Meadows Phase 7/8 and the Brazeau Lands.

Let me know if you require anything further.

Regards,

Jeff Shillington, P.Eng.
Project Manager, Development Review, South Branch
Planning, Infrastructure and Economic Development
City of Ottawa
tel: 580-2424 x 16960
email: jeff.shillington@ottawa.ca

From: Bougadis, John <John.Bougadis@ottawa.ca>
Sent: October 02, 2019 6:15 PM
To: Shillington, Jeffrey <jeff.shillington@ottawa.ca>
Subject: Bc for the Meadows - Phase 7/8 and Brazeau

Hi Jeff,

The attached BC is for the Meadows Phase 7 and 8 and the Brazeau lands.

Let me know if you have any questions.

John
X14990

From: Shillington, Jeffrey <jeff.shillington@ottawa.ca>
Sent: September 23, 2019 9:53 AM
To: Bougadis, John <John.Bougadis@ottawa.ca>
Subject: FW: The Meadows - Phase 7/8 Boundary Condition Request

John,

Please see the request below for BC's. Let me know if you need additional information.

Jeff

From: Anthony Temelini <ATemelini@dsel.ca>
Sent: September 12, 2019 1:40 PM
To: Shillington, Jeffrey <jeff.shillington@ottawa.ca>
Cc: Matt Wingate <MWingate@dsel.ca>
Subject: The Meadows - Phase 7/8 Boundary Condition Request

Hi Jeff,

Please see attached for the updated boundary condition request for the Meadows – Phase 7/8. Note that we require the boundary conditions for the latest fire flow requirements in order to compare modelling results with the assumptions made in the latest watermain report.

Can you please forward the request to the appropriate contact and let us know when we can expect to receive the boundary conditions?

Please let me know if you have any questions.

Thank you,

Anthony Temelini, P.Eng.
Junior Project Manager

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext.524
email: atemelini@dsel.ca

'

'

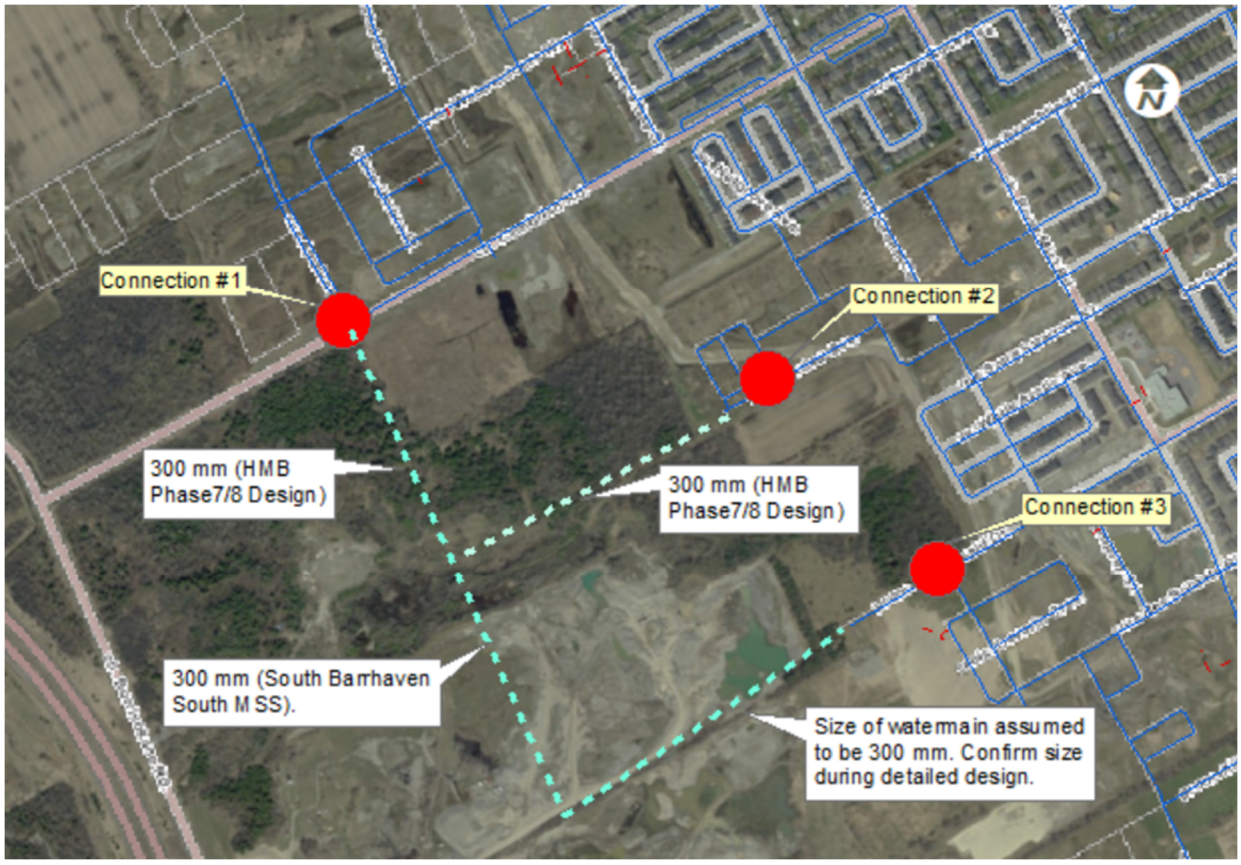
Boundary Conditions for HMB Phases 7 and 8 and Brazeau Lands

Information Provided:

Date provided: September 2019

Scenario	Demand	
	L/min	L/s
Average Daily Demand	846	14.10
Maximum Daily Demand	1961	32.69
Peak Hour	4224	70.40
Fire Flow Demand #1	10000	166.67
Fire Flow Demand #2	15000	250.00
Fire Flow Demand #3	17000	283.33

Location:



Results

Connection 1 - Cambrian Road

Demand Scenario	Existing Barrhaven PZ		Future Zone 3C	
	Head (m)	Pressure[1] (psi)	Head (m)	Pressure[1] (psi)
Maximum HGL	156.4	102.9	147.7	77.3
Peak Hour	135.7	60.4	142.8	70.4
Max Day plus Fire (#1)	144.0	72.2	140.0	66.4
Max Day plus Fire (#2)	135.4	59.9	134.9	59.2
Max Day plus Fire (#3)	133.7	57.4	132.5	55.7

[1] Ground Elevation = 93.3 m

Connection 2 - Brambling Way

Demand Scenario	Existing Barrhaven PZ		Future Zone 3C	
	Head (m)	Pressure[1] (psi)	Head (m)	Pressure[1] (psi)
Maximum HGL	156.4	100.1	147.7	74.6
Peak Hour	135.6	57.4	142.7	67.5
Max Day plus Fire (#1)	141.2	65.4	135.8	57.7
Max Day plus Fire (#2)	129.9	49.4	126.3	44.3
Max Day plus Fire (#3)	126.6	44.7	121.8	37.8

[1] Ground Elevation = 95.2 m

Connection 3 - Dundonald Drive

Demand Scenario	Existing Barrhaven PZ		Future Zone 3C	
	Head (m)	Pressure[1] (psi)	Head (m)	Pressure[1] (psi)
Maximum HGL	156.4	86.5	147.7	61.0
Peak Hour	135.7	43.9	142.6	53.7
Max Day plus Fire (#1)	142.0	52.9	133.0	40.0
Max Day plus Fire (#2)	131.5	38.0	120.6	22.5
Max Day plus Fire (#3)	128.7	34.0	114.7	14.0

[1] Ground Elevation = 104.8 m

Notes:

1) As per the Ontario Building Code in areas that may be occupied, the static pressure at any fixture shall not exceed 552 kPa (80 psi.) Pressure control measures to be considered are as follows, in order of preference:
   a) If possible, systems to be designed to residual pressures of 345 to 552 kPa (50 to 80 psi) in all occupied areas outside of the public right-of-way without special pressure control equipment.

b) Pressure reducing valves to be installed immediately downstream of the isolation valve in the home/ building, located downstream of the meter so it is owner maintained.

2) A third pump was turned on during all fire simulations under Existing Barrhaven Pressure.
3) Future pipes were added to the water model as shown in the figure above.

Disclaimer

The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

APPENDIX C

Wastewater Collection

3713 Borrisokane Road
Proposed Site Conditions

Wastewater Design Flows per Unit Count
City of Ottawa Sewer Design Guidelines, 2004

Site Area 7.855 **ha**

Extraneous Flow Allowances

Infiltration / Inflow (Dry)	**0.39**	**L/s**
Infiltration / Inflow (Wet)	**2.20**	**L/s**
Infiltration / Inflow (Total)	**2.59**	**L/s**

Institutional / Commercial / Industrial Contributions

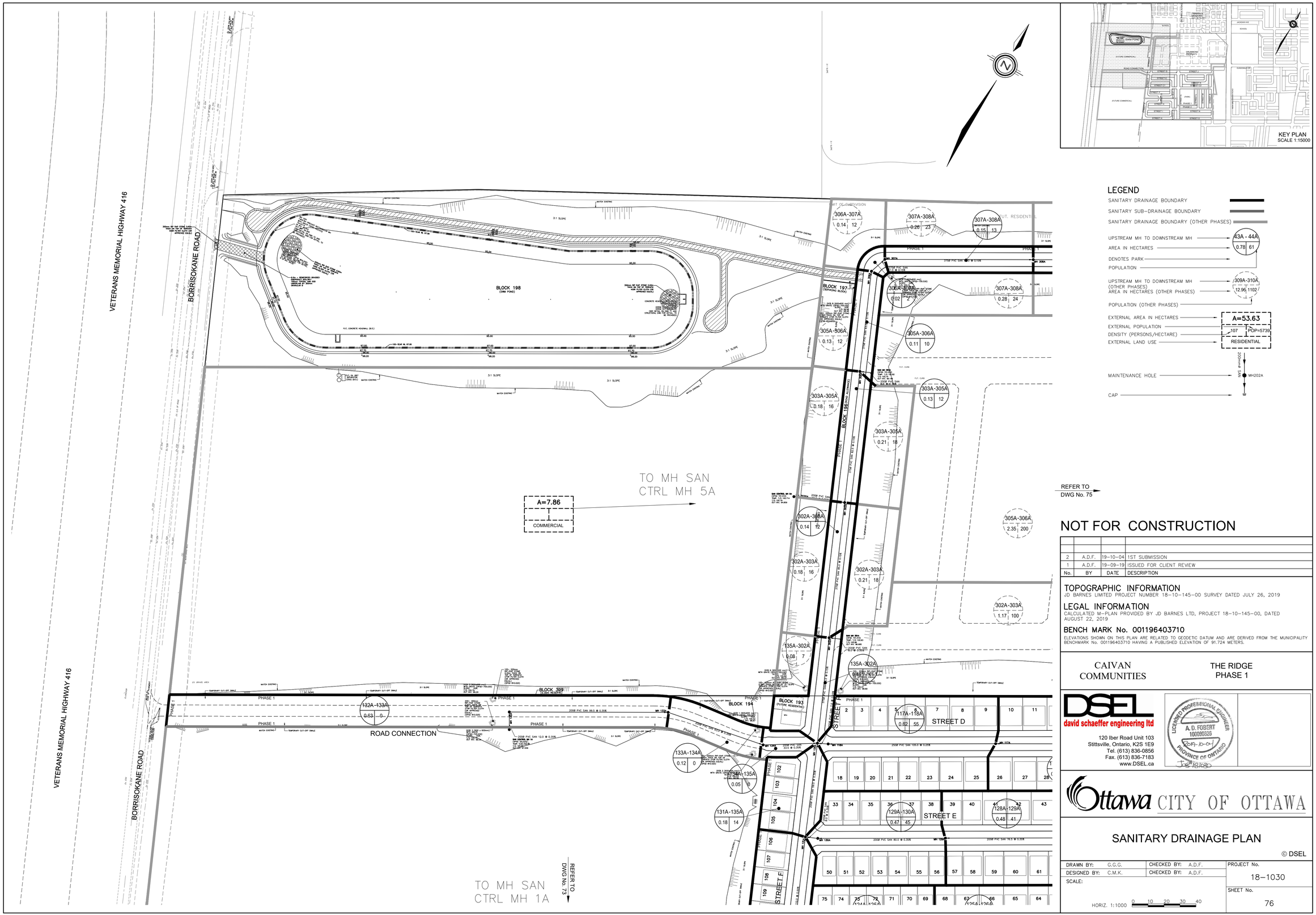
Property Type	**Unit Rate**		**No. of Units**	**Avg Wastewater (L/s)**
Water Closets*	150.0	L/fixture/hour	26	0.54
Lavatories*	150.0	L/fixture/hour	22	0.46
Kitchen Sinks	375	L/fixture/day	2	0.01
Showers*	575	L/fixture/hour	4	0.32
Mop Sink	375	L/fixture/day	1	0.00
Drinking Fountains*	375	L/fixture/day	2	0.10
Industrial - Light**	35,000	L/gross ha/d	0.93	0.38
Industrial - Heavy**	55,000	L/gross ha/d		0.00
			Average I/C/I Flow	**1.82**
			Peak Institutional / Commercial Flow	1.51
			Peak Industrial Flow**	1.66
			Peak I/C/I Flow	**3.18**

** assuming a 12 hour commercial operation*
*** peak industrial flow per City of Ottawa Sewer Design Guidelines Appendix 4B (Peaking Factor of 4.4)*

Total Estimated Average Dry Weather Flow Rate	**2.21**	**L/s**
Total Estimated Peak Dry Weather Flow Rate	**3.57**	**L/s**
Total Estimated Peak Wet Weather Flow Rate	**5.77**	**L/s**

Design Brief for Caivan Communities
The Ridge (Brazeau Lands)
David Schaeffer Engineering Ltd.

DSEL No. 18-1030
October 4, 2019 Rev1



NOT FOR CONSTRUCTION

No.	BY	DATE	DESCRIPTION
2	A.D.F.	19-10-04	1ST SUBMISSION
1	A.D.F.	19-09-19	ISSUED FOR CLIENT REVIEW

TOPOGRAPHIC INFORMATION
JD BARNES LIMITED PROJECT NUMBER 18-10-145-00 SURVEY DATED JULY 26, 2019

LEGAL INFORMATION
CALCULATED M-PLAN PROVIDED BY JD BARNES LTD, PROJECT 18-10-145-00, DATED AUGUST 22, 2019

BENCH MARK No. 001196403710
ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM THE MUNICIPALITY BENCHMARK No. 001196403710 HAVING A PUBLISHED ELEVATION OF 91.724 METERS.

CAIVAN COMMUNITIES

THE RIDGE PHASE 1

DSEL
david schaeffer engineering ltd
120 Iber Road Unit 103
Stittsville, Ontario, K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca

LICENSED PROFESSIONAL ENGINEER
A.D. FOBERT
100090526
PROVINCE OF ONTARIO
2019-10-04

Ottawa CITY OF OTTAWA

SANITARY DRAINAGE PLAN

DRAWN BY:	G.G.G.	CHECKED BY:	A.D.F.
DESIGNED BY:	C.M.K.	CHECKED BY:	A.D.F.

SCALE:
HORIZ. 1:1000 0 10 20 30 40

PROJECT No. 18-1030

SHEET No. 76

CITY PLAN No. XXXXXX
CITY FILE No. D07-16-18-0011

SANITARY SEWER CALCULATION SHEET

Sewer has sufficient capacity to accommodate anticipated flow of 5.77 L/s from subject site.
5.77 + 9.96 = 15.73 L/s
Sewer capacity = 19.40 L/s

Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION									COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE						
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	UNITS Singles	UNITS Townhouse	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
FUTURE ROAD (DRUMMOND LANDS)																													
	304A	305A	2.35				200	2.35	200	3.52	2.28		0.00		0.00		0.00	0.00	2.35	2.35	0.78	3.06	8.0	200	0.35	19.40	0.16	0.62	0.45
To STREET P, Pipe 305A - 306A								2.35	200				0.00		0.00		0.00			2.35									
COMMERCIAL BLOCK - NORTH (DRUMMOND LANDS)																													
	CTRL MH 5A	303A						0.00				7.86	7.86		0.00		0.00	2.55	7.86	7.86	2.59	5.14	32.0	200	0.35	19.40	0.26	0.62	0.52
To STREET P, Pipe 303A - 305A								0.00	0				7.86		0.00		0.00			7.86									
FUTURE ROAD (DRUMMOND LANDS)																													
	301A	302A	1.17				100	1.17	100	3.59	1.17		0.00		0.00		0.00	0.00	1.17	1.17	0.39	1.55	8.0	200	0.35	19.40	0.08	0.62	0.37
To STREET P, Pipe 302A - 303A								1.17	100				0.00		0.00		0.00			1.17									
COMMERCIAL BLOCK - SOUTH																													
	CTRL MH 1A	132A						0.00				14.82	14.82		0.00		0.00	4.80	14.82	14.82	4.89	9.69	12.0	200	0.35	19.40	0.50	0.62	0.61
To ROAD CONNECTION, Pipe 132A - 133A								0.00	0				14.82		0.00		0.00			14.82									
ROAD CONNECTION																													
Contribution From COMMERICAL BLOCK - SOUTH - 124, CTRL MH 1A - 132A								0.00	0				14.82		0.00		0.00		14.82	14.82									
	132A	133A	0.63				0	0.63	0				14.82		0.00		0.00	4.80	0.63	15.45	5.10	9.90	99.5	200	0.35	19.40	0.51	0.62	0.62
	133A	134A	0.12				0	0.75	0				14.82		0.00		0.00	4.80	0.12	15.57	5.14	9.94	63.0	200	0.35	19.40	0.51	0.62	0.62
	134A	135A	0.05				0	0.80	0				14.82		0.00		0.00	4.80	0.05	15.62	5.15	9.96	33.5	200	0.35	19.40	0.51	0.62	0.62
To STREET P, Pipe 135A - 302A								0.80	0				14.82		0.00		0.00			15.62									
STREET C1																													
	124A	125A	0.48	14	14		48	0.48	48	3.65	0.57		0.00		0.00		0.00	0.00	0.48	0.48	0.16	0.73	79.0	200	0.75	28.40	0.03	0.90	0.39
	125A	126A	0.50	12	12		41	0.98	89	3.61	1.04		0.00		0.00		0.00	0.00	0.50	0.98	0.32	1.36	91.0	200	0.35	19.40	0.07	0.62	0.35
To STREET E, Pipe 126A - 127A								0.98	89				0.00		0.00		0.00			0.98									
STREET E																													
Contribution From STREET F, Pipe 123A - 126A								0.81	63				0.00		0.00		0.00		0.81	0.81									
Contribution From STREET C1, Pipe 125A - 126A								0.98	89				0.00		0.00		0.00		0.98	1.79									
	126A	127A	0.24	3	3		11	2.03	163	3.54	1.87		0.00		0.00		0.00	0.00	0.24	2.03	0.67	2.54	50.0	200	0.35	19.40	0.13	0.62	0.42
	127A	128A	0.13	2	2		7	2.16	170	3.54	1.95		0.00		0.00		0.00	0.00	0.13	2.16	0.71	2.66	12.5	200	0.65	26.44	0.10	0.84	0.53
	128A	129A	0.48	12	12		41	2.64	211	3.51	2.40		0.00		0.00		0.00	0.00	0.48	2.64	0.87	3.27	76.5	200	0.35	19.40	0.17	0.62	0.46
	129A	130A	0.47	13	13		45	3.11	256	3.49	2.89		0.00		0.00		0.00	0.00	0.47	3.11	1.03	3.92	80.0	200	0.35	19.40	0.20	0.62	0.48
	130A	131A						3.11	256	3.49	2.89		0.00		0.00		0.00	0.00	0.00	3.11	1.03	3.92	8.0	200	0.35	19.40	0.20	0.62	0.48
To STREET F, Pipe 131A - 135A								3.11	256				0.00		0.00		0.00			3.11									
STREET I																													
	211A	204A	0.52	12	12		41	0.52	41	3.67	0.49		0.00		0.00		0.00	0.00	0.52	0.52	0.17	0.66	88.5	200	0.80	29.34	0.02	0.93	0.37
	204A	205A	0.59	15	15		51	1.11	92	3.60	1.07		0.00		0.00		0.00	0.00	0.59	1.11	0.37	1.44	103.0	200	0.35	19.40	0.07	0.62	0.36
	205A	206A						1.11	92	3.60	1.07		0.00		0.00		0.00	0.00	0.00	1.11	0.37	1.44	8.0	200	0.35	19.40	0.07	0.62	0.36
To STREET H, Pipe 206A - 207A								1.11	92				0.00		0.00		0.00			1.11									
STREET H																													
	209A	210A	0.09	1	1		4	0.09	4	3.76	0.05		0.00		0.00		0.00	0.00	0.09	0.09	0.03	0.08	12.5	200	2.95	56.33	0.00	1.79	0.29
	210A	211A	0.20	4	4		14	0.29	18	3.71	0.22		0.00		0.00		0.00	0.00	0.20	0.29	0.10	0.31	50.5	200	3.80	63.94	0.00	2.04	0.52
	211A	212A	0.19	4	4		14	0.48	32	3.68	0.38		0.00		0.00		0.00	0.00	0.19	0.48	0.16	0.54	50.0	200	0.45	22.00	0.02	0.70	0.29

DESIGN PARAMETERS

Park Flow =	9300	L/ha/da	0.10764	l/s/Ha			
Average Daily Flow =	280	l/p/day			Industrial Peak Factor = as per MOE Graph		
Comm/Inst Flow =	28000	L/ha/da	0.3241	l/s/Ha	Extraneous Flow =	0.330	L/s/ha
Industrial Flow =	35000	L/ha/da	0.40509	l/s/Ha	Minimum Velocity =	0.600	m/s
Max Res. Peak Factor =	3.80				Manning's n = (Conc)	0.013	(Pvc) 0.013
Commercial/Inst./Park Peak Factor =	1.00				Townhouse coeff=	2.7	
Institutional =	0.32	l/s/Ha			Single house coeff=	3.4	

Designed: SLM

Checked: ADF

Dwg. Reference: Sanitary Drainage Plan, Dwgs. No. 73-76

PROJECT: **Caivan Communities - Brazeau Phase 1**

LOCATION: **City of Ottawa**

File Ref: 18-1030

Date: **20 Sep 2019**

Sheet No. 1 of 5

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION				RESIDENTIAL AREA AND POPULATION									COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE						
STREET		FROM M.H.	TO M.H.	AREA (ha)	UNITS	UNITS Singles	UNITS Townhouse	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
		212A	213A	0.09	1	1		4	0.57	36	3.67	0.43		0.00		0.00		0.00	0.00	0.09	0.57	0.19	0.62	12.5	200	1.55	40.83	0.02	1.30	0.47
		213A	214A	0.51	13	13		45	1.08	81	3.61	0.95		0.00		0.00		0.00	0.00	0.51	1.08	0.36	1.31	86.5	200	2.35	50.28	0.03	1.60	0.68
To STREET G, Pipe 214A - 119A									1.08	81				0.00		0.00		0.00			1.08									
		209A	201A	0.56	13	13		45	0.56	45	3.66	0.53		0.00		0.00		0.00	0.00	0.56	0.56	0.18	0.72	93.5	200	0.65	26.44	0.03	0.84	0.36
		201A	202A	0.62	17	17		58	1.18	103	3.59	1.20		0.00		0.00		0.00	0.00	0.62	1.18	0.39	1.59	94.5	200	0.95	31.97	0.05	1.02	0.53
		202A	203A	0.13	2	2		7	1.31	110	3.59	1.28		0.00		0.00		0.00	0.00	0.13	1.31	0.43	1.71	13.5	200	0.80	29.34	0.06	0.93	0.50
		203A	206A	0.17	4	4		14	1.48	124	3.57	1.44		0.00		0.00		0.00	0.00	0.17	1.48	0.49	1.92	50.5	200	1.10	34.40	0.06	1.09	0.59
Contribution From STREET I, Pipe 205A - 206A									1.11	92				0.00		0.00		0.00		1.11	2.59									
		206A	207A	0.20	5	5		17	2.79	233	3.50	2.64		0.00		0.00		0.00	0.00	0.20	2.79	0.92	3.56	50.5	200	1.05	33.61	0.11	1.07	0.69
		207A	208A	0.12	2	2		7	2.91	240	3.49	2.72		0.00		0.00		0.00	0.00	0.12	2.91	0.96	3.68	12.0	200	2.45	51.34	0.07	1.63	0.94
		208A	214A	0.54	15	15		51	3.45	291	3.47	3.27		0.00		0.00		0.00	0.00	0.54	3.45	1.14	4.41	90.0	200	1.90	45.21	0.10	1.44	0.91
To STREET G, Pipe 214A - 119A									3.45	291				0.00		0.00		0.00			3.45									
STREET G																														
Contribution From STREET H, Pipe 208A - 214A									3.45	291				0.00		0.00		0.00		3.45	3.45									
Contribution From STREET H, Pipe 213A - 214A									1.08	81				0.00		0.00		0.00		1.08	4.53									
		214A	119A	0.08				0	4.61	372	3.43	4.13		0.00		0.00		0.00	0.00	0.08	4.61	1.52	5.66	59.0	200	1.65	42.13	0.13	1.34	0.93
To STREET F, Pipe 119A - 120A									4.61	372				0.00		0.00		0.00			4.61									
STREET F																														
		119A	122A	0.52	13	13		45	0.52	45	3.66	0.53		0.00		0.00		0.00	0.00	0.52	0.52	0.17	0.71	86.0	200	0.65	26.44	0.03	0.84	0.36
		122A	123A	0.09	1	1		4	0.61	49	3.65	0.58		0.00		0.00		0.00	0.00	0.09	0.61	0.20	0.78	12.5	200	1.50	40.17	0.02	1.28	0.50
		123A	126A	0.20	4	4		14	0.81	63	3.63	0.74		0.00		0.00		0.00	0.00	0.20	0.81	0.27	1.01	50.0	200	1.60	41.49	0.02	1.32	0.55
To STREET E, Pipe 126A - 127A									0.81	63				0.00		0.00		0.00			0.81									
Contribution From STREET G, Pipe 214A - 119A									4.61	372				0.00		0.00		0.00		4.61	4.61									
		119A	120A	0.47	13	13		45	5.08	417	3.41	4.61		0.00		0.00		0.00	0.00	0.47	5.08	1.68	6.29	81.0	200	0.35	19.40	0.32	0.62	0.55
		120A	121A	0.14	2	2		7	5.22	424	3.41	4.68		0.00		0.00		0.00	0.00	0.14	5.22	1.72	6.41	13.5	200	0.35	19.40	0.33	0.62	0.55
		121A	131A	0.43	10	10		34	5.65	458	3.39	5.04		0.00		0.00		0.00	0.00	0.43	5.65	1.86	6.90	110.0	200	0.50	23.19	0.30	0.74	0.64
Contribution From STREET E, Pipe 130A - 131A									3.11	256				0.00		0.00		0.00		3.11	8.76									
		131A	135A	0.18	4	4		14	8.94	728	3.31	7.80		0.00		0.00		0.00	0.00	0.18	8.94	2.95	10.75	59.0	200	0.35	19.40	0.55	0.62	0.63
To STREET P, Pipe 135A - 302A									8.94	728				0.00		0.00		0.00			8.94									
STREET K																														
		107A	108A	0.14	3		3	9	0.14	9	3.74	0.11		0.00		0.00		0.00	0.00	0.14	0.14	0.05	0.16	12.5	200	2.45	51.34	0.00	1.63	0.36
		108A	110A	0.17	5		5	14	0.31	23	3.70	0.28		0.00		0.00		0.00	0.00	0.17	0.31	0.10	0.38	50.5	200	0.35	19.40	0.02	0.62	0.24
To STREET J, Pipe 110A - 111A									0.31	23				0.00		0.00		0.00			0.31									
		107A	112A	0.45	18		18	49	0.45	49	3.65	0.58		0.00		0.00		0.00	0.00	0.45	0.45	0.15	0.73	73.5	200	0.70	27.44	0.03	0.87	0.37
		112A	113A	0.43	16		16	44	0.88	93	3.60	1.09		0.00		0.00		0.00	0.00	0.43	0.88	0.29	1.38	70.5	200	0.35	19.40	0.07	0.62	0.36
		113A	114A	0.12	3		3	9	1.00	102	3.59	1.19		0.00		0.00		0.00	0.00	0.12	1.00	0.33	1.52	12.5	200	0.35	19.40	0.08	0.62	0.36
		114A	115A	0.18	5		5	14	1.18	116	3.58	1.35		0.00		0.00		0.00	0.00	0.18	1.18	0.39	1.74	50.5	200	0.40	20.74	0.08	0.66	0.40
To STREET J, Pipe 115A - 116A									1.18	116				0.00		0.00		0.00			1.18									
COMMERCIAL BLOCK - EAST																														
		CTRL MH 2A	2250A						0.00				2.68	2.68		0.00		0.00	0.87	2.68	2.68	0.88	1.75	11.0	200	0.35	19.40	0.09	0.62	0.38
To STREET B, Pipe 2250A - 226A									0.00	0				2.68		0.00		0.00			2.68									

DESIGN PARAMETERS

Park Flow =	9300	L/ha/da	0.10764	l/s/Ha	
Average Daily Flow =	280	l/p/day			
Comm/Inst Flow =	28000	L/ha/da	0.3241	l/s/Ha	
Industrial Flow =	35000	L/ha/da	0.40509	l/s/Ha	
Max Res. Peak Factor =	3.80				
Commercial/Inst./Park Peak Factor =	1.00				
Institutional =	0.32	l/s/Ha			

Industrial Peak Factor = as per MOE Graph
Extraneous Flow = 0.330 L/s/ha
Minimum Velocity = 0.600 m/s
Manning's n = (Conc) 0.013 (Pvc) 0.013
Townhouse coeff= 2.7
Single house coeff= 3.4

Designed: SLM

Checked: ADF

Dwg. Reference: Sanitary Drainage Plan, Dwgs. No. 73-76

PROJECT: **Caivan Communities - Brazeau Phase 1**

LOCATION: **City of Ottawa**

File Ref: 18-1030

Date: **20 Sep 2019**

Sheet No. 2 of 5

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION				RESIDENTIAL AREA AND POPULATION									COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE						
STREET		FROM M.H.	TO M.H.	AREA (ha)	UNITS	UNITS Singles	UNITS Townhouse	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
STREET B																													
		224A	225A	0.33	9		9	25	0.33	25	3.69	0.30		0.00		0.00		0.00	0.00	0.33	0.33	0.11	0.41	75.0	200	0.65	26.44	0.02	0.84	0.30
		225A	2250A	0.27	8		8	22	0.60	47	3.66	0.56		0.00		0.00		0.00	0.00	0.27	0.60	0.20	0.75	67.5	200	0.90	31.12	0.02	0.99	0.41
Contribution From COMMERCIAL BLOCK - EAST - 122, Pipe CTRL MH 2A - 2250A									0.00	0				2.68		0.00		0.00		2.68	3.28									
		2250A	226A	0.15	3		3	9	0.75	56	3.64	0.66		2.68		0.00		0.00	0.87	0.15	3.43	1.13	2.66	46.0	200	1.40	38.81	0.07	1.24	0.70
		226A	109A	0.34	9		9	25	1.09	81	3.61	0.95		2.68		0.00		0.00	0.87	0.34	3.77	1.24	3.06	92.0	200	1.60	41.49	0.07	1.32	0.76
To STREET J, Pipe 109A - 110A									1.09	81				2.68		0.00		0.00			3.77									
STREET J																													
		CTRL MH 3A	109A	1.92				164	1.92	164	3.54	1.88		0.00		0.00		0.00	0.00	1.92	1.92	0.63	2.52	11.0	200	0.35	19.40	0.13	0.62	0.42
Contribution From STREET B, Pipe 226A - 109A									1.09	81				2.68		0.00		0.00		3.77	5.69									
		109A	110A	0.25	6		6	17	3.26	262	3.48	2.96		2.68		0.00		0.00	0.87	0.25	5.94	1.96	5.79	60.0	200	1.20	35.93	0.16	1.14	0.84
Contribution From STREET K, Pipe 108A - 110A									0.31	23				0.00		0.00		0.00		0.31	6.25									
		110A	111A	0.41	16		16	44	3.98	329	3.45	3.68		2.68		0.00		0.00	0.87	0.41	6.66	2.20	6.74	74.5	200	0.50	23.19	0.29	0.74	0.64
		111A	115A	0.49	19		19	52	4.47	381	3.43	4.23		2.68		0.00		0.00	0.87	0.49	7.15	2.36	7.46	87.5	200	0.35	19.40	0.38	0.62	0.58
Contribution From STREET K, Pipe 114A - 115A									1.18	116				0.00		0.00		0.00		1.18	8.33									
		115A	116A	0.24	6		6	17	5.89	514	3.37	5.62		2.68		0.00		0.00	0.87	0.24	8.57	2.83	9.32	63.0	200	0.35	19.40	0.48	0.62	0.61
To STREET D, Pipe 116A - 117A									5.89	514				2.68		0.00		0.00			8.57									
STREET D																													
Contribution From STREET A, Pipe 106A - 116A									7.71	651				0.00		0.00		1.72		9.43	9.43									
Contribution From STREET J, Pipe 115A - 116A									5.89	514				2.68		0.00		0.00		8.57	18.00									
		116A	117A	0.62	15	15		51	14.22	1216	3.19	12.59		2.68		0.00		1.72	1.05	0.62	18.62	6.14	19.79	117.0	250	0.25	29.73	0.67	0.61	0.65
		117A	118A	0.62	16	16		55	14.84	1271	3.18	13.12		2.68		0.00		1.72	1.05	0.62	19.24	6.35	20.52	105.0	250	0.25	29.73	0.69	0.61	0.65
		118A	135A						14.84	1271	3.18	13.12		2.68		0.00		1.72	1.05	0.00	19.24	6.35	20.52	7.0	250	0.25	29.73	0.69	0.61	0.65
To STREET P, Pipe 135A - 302A									14.84	1271				2.68		0.00		1.72			19.24									
STREET P																													
Contribution From STREET D, Pipe 118A - 135A									14.84	1271				2.68		0.00		1.72		19.24	19.24									
Contribution From STREET F, Pipe 131A - 135A									8.94	728				0.00		0.00		0.00		8.94	28.18									
Contribution From ROAD CONNECTION, Pipe 134A - 135A									0.80	0				14.82		0.00		0.00		15.62	43.80									
				0.08				7	24.66	2006				17.50		0.00		1.72		0.08	43.88									
		135A	302A	0.15	1	1		4	24.81	2010	3.07	19.98		17.50		0.00		1.72	5.86	0.15	44.03	14.53	40.37	66.5	375	0.15	67.91	0.59	0.61	0.64
Contribution From FUTURE ROAD (DRUMMOND LANDS) - 101, Pipe 301A - 302A									1.17	100				0.00		0.00		0.00		1.17	45.20									
				0.14				12	26.12	2122				17.50		0.00		1.72		0.14	45.34									
				0.18				16	26.30	2138				17.50		0.00		1.72		0.18	45.52									
		302A	303A	0.21				18	26.51	2156	3.05	21.30		17.50		0.00		1.72	5.86	0.21	45.73	15.09	42.24	85.0	375	0.15	67.91	0.62	0.61	0.65
Contribution From FUTURE ROAD (DRUMMOND LANDS) - 125, Pipe 3030A - 303A									0.00	0				7.86		0.00		0.00		7.86	53.59									
				0.13				12	26.64	2168				25.36		0.00		1.72		0.13	53.72									
				0.18				16	26.82	2184				25.36		0.00		1.72		0.18	53.90									
		303A	305A	0.21				18	27.03	2202	3.04	21.71		25.36		0.00		1.72	8.40	0.21	54.11	17.86	47.97	82.5	375	0.15	67.91	0.71	0.61	0.67
Contribution From FUTURE ROAD (DRUMMOND LANDS) - 102, Pipe 304A - 305A									2.35	200				0.00		0.00		0.00		2.35	56.46									
				0.11				10	29.49	2412				25.36		0.00		1.72		0.11	56.57									
		305A	306A	0.13				12	29.62	2424	3.02	23.69		25.36		0.00		1.72	8.40	0.13	56.70	18.71	50.80	63.0	375	0.15	67.91	0.75	0.61	0.67
				0.02				2	29.64	2426				25.36		0.00		1.72		0.02	56.72									
		306A	307A	0.14				12	29.78	2438	3.01	23.81		25.36		0.00		1.72	8.40	0.14	56.86	18.76	50.98	11.0	375	0.15	67.91	0.75	0.61	0.67

DESIGN PARAMETERS

Park Flow =	9300	L/ha/da	0.10764	l/s/Ha	
Average Daily Flow =	280	l/p/day			
Comm/Inst Flow =	28000	L/ha/da	0.3241	l/s/Ha	
Industrial Flow =	35000	L/ha/da	0.40509	l/s/Ha	
Max Res. Peak Factor =	3.80				
Commercial/Inst./Park Peak Factor =	1.00				
Institutional =	0.32	l/s/Ha			

Industrial Peak Factor = as per MOE Graph

Extraneous Flow =	0.330	L/s/ha		
Minimum Velocity =	0.600	m/s		
Manning's n =	(Conc) 0.013	(Pvc) 0.013		
Townhouse coeff=	2.7			
Single house coeff=	3.4			

Designed: SLM	PROJECT: **Caivan Communities - Brazeau Phase 1**		
Checked: ADF	LOCATION: **City of Ottawa**		
Dwg. Reference: Sanitary Drainage Plan, Dwgs. No. 73-76	File Ref: 18-1030	Date: **20 Sep 2019**	Sheet No. 3 of 5

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION									COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE						
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	UNITS Singles	UNITS Townhouse	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
			0.15				13	29.93	2451				25.36		0.00		1.72		0.15	57.01									
			0.26				23	30.19	2474				25.36		0.00		1.72		0.26	57.27									
	307A	308A	0.28				24	30.47	2498	3.01	24.34		25.36		0.00		1.72	8.40	0.28	57.55	18.99	51.74	93.0	375	0.15	67.91	0.76	0.61	0.68
			0.15				13	30.62	2511				25.36		0.00		1.72		0.15	57.70									
			0.23				20	30.85	2531				25.36		0.00		1.72		0.23	57.93									
	308A	310A	0.24				21	31.09	2552	3.00	24.82		25.36		0.00		1.72	8.40	0.24	58.17	19.20	52.42	94.0	375	0.15	67.91	0.77	0.61	0.68
To STREET A, Pipe 310A - 800A								31.09	2552				25.36		0.00		1.72			58.17									
PARK BLOCK																													
	CTRL MH 4A	104A						0.00					0.00		0.00	1.72	1.72	0.19	1.72	1.72	0.57	0.75	10.5	200	0.35	19.40	0.04	0.62	0.29
To STREET C2, Pipe 104A - 106A								0.00	0				0.00		0.00		1.72			1.72									
STREET L																													
	229A	230A	0.42	15		15	41	0.42	41	3.67	0.49		0.00		0.00		0.00	0.00	0.42	0.42	0.14	0.63	73.5	200	2.00	46.38	0.01	1.48	0.51
	230A	103A	0.48	18		18	49	0.90	90	3.60	1.05		0.00		0.00		0.00	0.00	0.48	0.90	0.30	1.35	90.0	200	2.00	46.38	0.03	1.48	0.65
To STREET C2, Pipe 103A - 104A								0.90	90				0.00		0.00		0.00			0.90									
STREET M																													
	227A	228A	0.47	18		18	49	0.47	49	3.65	0.58		0.00		0.00		0.00	0.00	0.47	0.47	0.16	0.74	72.5	200	2.00	46.38	0.02	1.48	0.53
	228A	102A	0.48	18		18	49	0.95	98	3.60	1.14		0.00		0.00		0.00	0.00	0.48	0.95	0.31	1.46	90.0	200	0.85	30.24	0.05	0.96	0.49
To STREET C2, Pipe 102A - 103A								0.95	98				0.00		0.00		0.00			0.95									
STREET C2																													
	101A	102A	0.14	3		3	9	0.14	9	3.74	0.11		0.00		0.00		0.00	0.00	0.14	0.14	0.05	0.16	25.5	200	2.60	52.89	0.00	1.68	0.34
Contribution From STREET M, Pipe 228A - 102A								0.95	98				0.00		0.00		0.00		0.95	1.09									
	102A	103A	0.22	7		7	19	1.31	126	3.57	1.46		0.00		0.00		0.00	0.00	0.22	1.31	0.43	1.89	59.0	200	1.70	42.76	0.04	1.36	0.67
Contribution From STREET L, Pipe 230A - 103A								0.90	90				0.00		0.00		0.00		0.90	2.21									
	103A	104A	0.46	14		14	38	2.67	254	3.49	2.87		0.00		0.00		0.00	0.00	0.46	2.67	0.88	3.75	120.0	200	0.35	19.40	0.19	0.62	0.47
Contribution From PARK BLOCK- 123, CTRL MH 4A - 104A								0.00	0				0.00		0.00		1.72			4.39									
	104A	106A	0.08	1		1	3	2.75	257	3.49	2.90		0.00		0.00		1.72	0.19	0.08	4.47	1.48	4.56	45.5	200	0.35	19.40	0.24	0.62	0.50
To STREET A, Pipe 106A - 116A								2.75	257				0.00		0.00		1.72			4.47									
STREET N																													
	220A	221A	0.42	10		10	27	0.42	27	3.69	0.32		0.00		0.00		0.00	0.00	0.42	0.42	0.14	0.46	77.5	200	0.95	31.97	0.01	1.02	0.35
	221A	222A	0.49	18		18	49	0.91	76	3.62	0.89		0.00		0.00		0.00	0.00	0.49	0.91	0.30	1.19	93.0	200	0.35	19.40	0.06	0.62	0.34
	222A	223A	0.52	20		20	54	1.43	130	3.57	1.50		0.00		0.00		0.00	0.00	0.52	1.43	0.47	1.98	100.5	200	0.35	19.40	0.10	0.62	0.40
To STREET A, Pipe 223A - 105A								1.43	130				0.00		0.00		0.00			1.43									
STREET O																													
	215A	216A	0.49	12	12		41	0.49	41	3.67	0.49		0.00		0.00		0.00	0.00	0.49	0.49	0.16	0.65	68.5	200	0.85	30.24	0.02	0.96	0.39
	216A	217A	0.72	17	17		58	1.21	99	3.60	1.15		0.00		0.00		0.00	0.00	0.72	1.21	0.40	1.55	107.0	200	0.35	19.40	0.08	0.62	0.37
	217A	219A	0.42	12	12		41	1.63	140	3.56	1.62		0.00		0.00		0.00	0.00	0.42	1.63	0.54	2.15	97.0	200	0.35	19.40	0.11	0.62	0.40
To STREET A, Pipe 219A - 223A								1.63	140				0.00		0.00		0.00			1.63									
STREET A																													
	218A	219A	0.13	2	2		7	0.13	7	3.74	0.08		0.00		0.00		0.00	0.00	0.13	0.13	0.04	0.13	24.0	200	2.65	53.39	0.00	1.70	0.35
Contribution From STREET O, Pipe 217A - 219A								1.63	140				0.00		0.00		0.00		1.63	1.76									
	219A	223A	0.23	4	4		14	1.99	161	3.54	1.85		0.00		0.00		0.00	0.00	0.23	1.99	0.66	2.51	59.0	200	0.85	30.24	0.08	0.96	0.57

DESIGN PARAMETERS

Park Flow =	9300	L/ha/da	0.10764	l/s/Ha			
Average Daily Flow =	280	l/p/day			Industrial Peak Factor = as per MOE Graph		
Comm/Inst Flow =	28000	L/ha/da	0.3241	l/s/Ha	Extraneous Flow =	0.330	L/s/ha
Industrial Flow =	35000	L/ha/da	0.40509	l/s/Ha	Minimum Velocity =	0.600	m/s
Max Res. Peak Factor =	3.80				Manning's n = (Conc)	0.013	(Pvc) 0.013
Commercial/Inst./Park Peak Factor =	1.00				Townhouse coeff=	2.7	
Institutional =	0.32	l/s/Ha			Single house coeff=	3.4	

Designed: SLM

Checked: ADF

Dwg. Reference: Sanitary Drainage Plan, Dwgs. No. 73-76

PROJECT: **Caivan Communities - Brazeau Phase 1**

LOCATION: **City of Ottawa**

File Ref: 18-1030

Date: **20 Sep 2019**

Sheet No. 4 of 5

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION									COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE						
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	UNITS Singles	UNITS Townhouse	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
Contribution From STREET N, Pipe 222A - 223A								1.43	130				0.00		0.00		0.00		1.43	3.42									
	223A	105A	0.42	6	6		21	3.84	312	3.46	3.50		0.00		0.00		0.00	0.00	0.42	3.84	1.27	4.76	82.5	200	0.95	31.97	0.15	1.02	0.73
	105A	106A	0.42	7	7		24	4.26	336	3.45	3.75		0.00		0.00		0.00	0.00	0.42	4.26	1.41	5.16	94.0	200	1.30	37.40	0.14	1.19	0.83
Contribution From STREET C2, Pipe 104A - 106A								2.75	257				0.00		0.00		1.72		4.47	8.73									
			0.35	11		11	30	7.36	623				0.00		0.00		1.72		0.35	9.08									
	106A	116A	0.35	8	8		28	7.71	651	3.33	7.03		0.00		0.00		1.72	0.19	0.35	9.43	3.11	10.32	118.0	200	0.35	19.40	0.53	0.62	0.63
To STREET D, Pipe 116A - 117A								7.71	651				0.00		0.00		1.72			9.43									
	309A	310A	8.79				748	8.79	748	3.30	8.00		0.00		0.00		0.00	0.00	8.79	8.79	2.90	10.91	8.5	250	0.35	35.18	0.31	0.72	0.63
Contribution From STREET P, Pipe 308A - 310A								31.09	2552				25.36		0.00		1.72		58.17	66.96									
	310A	800A	0.09				8	39.97	3308	2.92	31.35		25.36		0.00		1.72	8.40	0.09	67.05	22.13	61.89	36.0	375	0.25	87.67	0.71	0.79	0.86

DESIGN PARAMETERS

Park Flow =	9300	L/ha/da	0.10764	l/s/Ha			
Average Daily Flow =	280	l/p/day			Industrial Peak Factor = as per MOE Graph		
Comm/Inst Flow =	28000	L/ha/da	0.3241	l/s/Ha	Extraneous Flow =	0.330	L/s/ha
Industrial Flow =	35000	L/ha/da	0.40509	l/s/Ha	Minimum Velocity =	0.600	m/s
Max Res. Peak Factor =	3.80				Manning's n = (Conc)	0.013	(Pvc) 0.013
Commercial/Inst./Park Peak Factor =	1.00				Townhouse coeff=	2.7	
Institutional =	0.32	l/s/Ha			Single house coeff=	3.4	

Designed: SLM	PROJECT: **Caivan Communities - Brazeau Phase 1**		
Checked: ADF	LOCATION: **City of Ottawa**		
Dwg. Reference: Sanitary Drainage Plan, Dwgs. No. 73-76	File Ref: 18-1030	Date: **20 Sep 2019**	Sheet No. 5 of 5

APPENDIX D

Stormwater Management

3713 Borrisokane Road
Existing Conditions

Estimated Peak Stormwater Flow Rate
City of Ottawa Sewer Design Guidelines, 2012

Existing Drainage Charateristics From Internal Site

Area	7.86	ha
C	0.20	Rational Method runoff coefficient
L	303.23	m
Up Elev	109.4	m
Dn Elev	100.42	m
Slope	3.0	%
Tc	35.6	min

1) Time of Concentration per Federal Aviation Administration

$$t_c = \frac{1.8(1.1-C)L^{0.5}}{S^{0.333}}$$

tc, in minutes
C, rational method coefficient, (-)
L, length in ft
S, average watershed slope in %

Estimated Peak Flow

	2-year	5-year	100-year	
i	35.6	48.0	81.6	mm/hr
Q	155.5	209.3	445.2	L/s

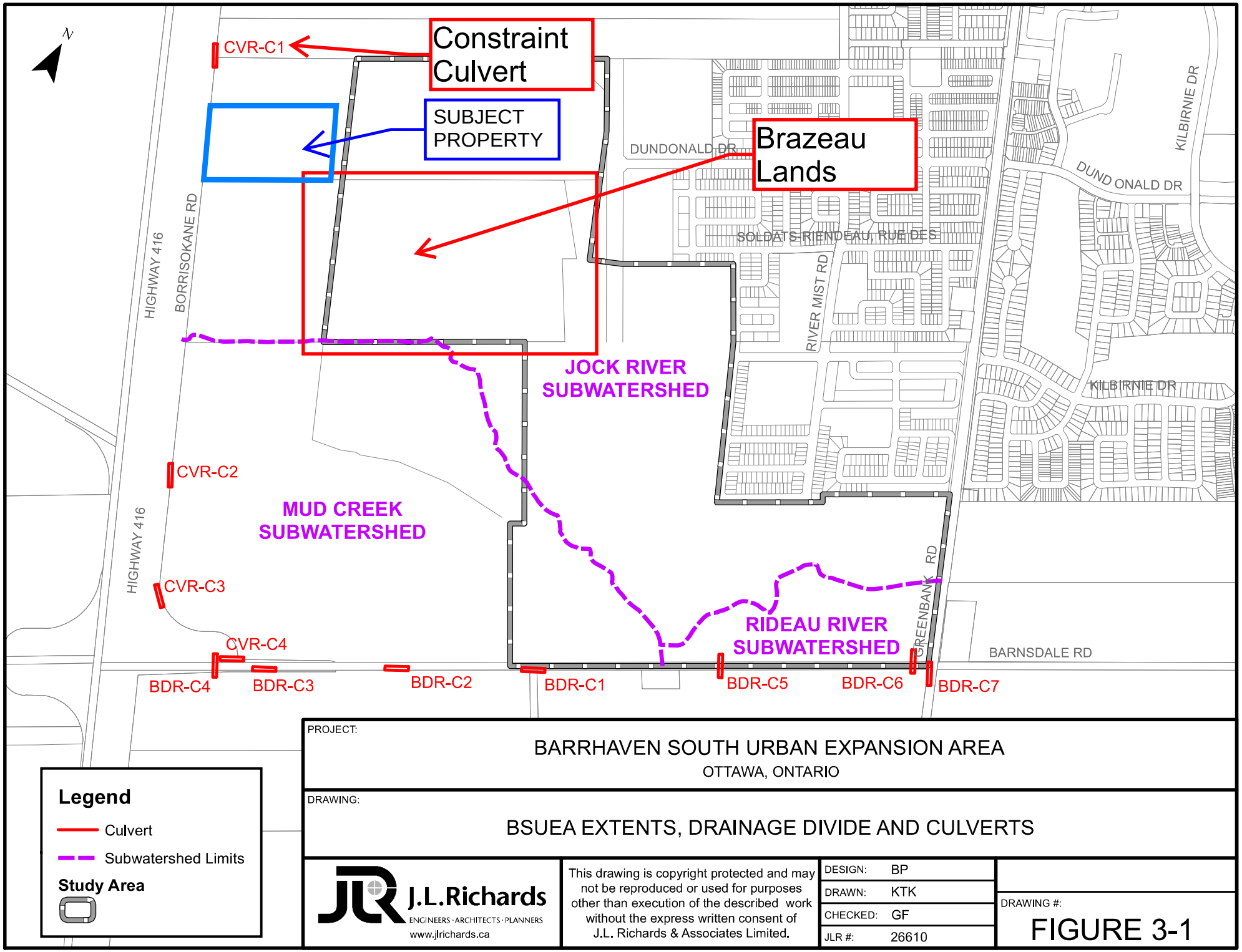
Note:
C value for the 100-year storm is increased by 25%, to a maximum of 1.0 per Ottawa Sewer Design Guidelines (5.4.5.2.1)

										Sewer Data								
Area ID	**Up**	**Down**	**Area**	**C**	**Indiv AxC**	**Acc AxC**	**T_C**	**I**	**Q**	**DIA**	**Slope**	**Length**	**$A_{hydraulic}$**	**R**	**Velocity**	**Qcap**	**Time Flow**	**Q / Q full**
			(ha)	**(-)**			**(min)**	**(mm/hr)**	**(L/s)**	**(mm)**	**(%)**	**(m)**	**(m^2)**	**(m)**	**(m/s)**	**(L/s)**	**(min)**	**(-)**
	CB100	CBMH1A	0.187	0.68	0.13	0.13	10.0	104.2	36.8	250	1.00	26.1	0.049	0.063	1.21	59.5	0.4	0.62
							10.4											
	CB101	CBMH1A	0.340	0.39	0.13	0.13	10.0	104.2	38.3	250	1.00	1.1	0.049	0.063	1.21	59.5	0.0	0.64
							10.0											
	CBMH1A	STM1B	0.111	0.65	0.07	0.33	10.4	102.3	94.2	375	0.35	15.3	0.110	0.094	0.94	103.7	0.3	0.91
							10.6											
	CB102	STM1B	0.099	0.57	0.06	0.06	10.0	104.2	16.3	250	1.00	3.6	0.049	0.063	1.21	59.5	0.0	0.27
							10.0											
	STM1B	STM1C			0.00	0.39	10.6	101.0	108.7	450	0.35	57.8	0.159	0.113	1.06	168.7	0.9	0.64
							11.5											
	CB103	STM1C	0.055	0.90	0.05	0.05	10.0	104.2	14.4	250	1.00	2.4	0.049	0.063	1.21	59.5	0.0	0.24
							10.0											
	STM1C	STM1D			0.00	0.44	11.5	96.7	117.5	450	0.50	16.1	0.159	0.113	1.27	201.6	0.2	0.58
	STM1D	STM1E			0.00	0.44	11.8	95.8	116.4	450	0.50	39.5	0.159	0.113	1.27	201.6	0.5	0.58
							12.3											
	CB104	STM1F	0.459	0.36	0.17	0.17	10.0	104.2	48.2	250	1.00	1.8	0.049	0.063	1.21	59.5	0.0	0.81
							10.0											
	CB105	STM1F	0.155	0.55	0.08	0.08	10.0	104.2	24.5	250	1.00	3	0.049	0.063	1.21	59.5	0.0	0.41
							10.0											
	STM1F	STM1E			0.00	0.25	10.0	104.0	72.5	375	0.50	23.8	0.110	0.094	1.12	124.0	0.4	0.58
							10.4											
	STM1E	STM1G			0.00	0.69	12.3	93.6	178.9	450	0.50	103.6	0.159	0.113	1.27	201.6	1.4	0.89
							13.6											
	CB106	STM1G	0.308	0.20	0.06	0.06	10.0	104.2	17.8	250	1.00	16.6	0.049	0.063	1.21	59.5	0.2	0.30
							10.2											
	CB107	STM1G	0.272	0.60	0.16	0.16	10.0	104.2	47.2	250	1.00	4.4	0.049	0.063	1.21	59.5	0.1	0.79
							10.1											
	CB108	STM1G	0.259	0.70	0.18	0.18	10.0	104.2	52.2	250	1.00	1.9	0.049	0.063	1.21	59.5	0.0	0.88
							10.0											
	STM1G	STM1H			0.00	1.09	13.6	88.3	268.1	525	0.50	48.5	0.216	0.131	1.40	304.1	0.6	0.88
							14.2											
	CB109	STM 1H	0.365	0.75	0.27	0.27	10.0	104.2	79.2	300	1.00	2	0.071	0.075	1.37	96.7	0.0	0.82
							10.0											
	BLDG A	STM1H	0.295	0.90	0.27	0.27	10.0	104.2	76.7	300	1.00	69	0.071	0.075	1.37	96.7	0.8	0.79
							10.8											

	STM 1H	STM2F			0.00	1.63	14.2	86.2	390.9	675	0.50	60.5	0.358	0.169	1.66	594.4	0.6	0.66
							14.8											
	CB200	STM2A	0.607	0.64	0.39	0.39	10.0	104.2	112.1	375	1.00	0.8	0.110	0.094	1.59	175.3	0.0	0.64
							10.0											
	STM2A	STM2B			0.00	0.39	10.0	104.1	112.0	375	0.50	28.9	0.110	0.094	1.12	124.0	0.4	0.90
							10.4											
	CB201	STM2B	0.604	0.65	0.39	0.39	10.0	104.2	113.8	375	1.00	1.6	0.110	0.094	1.59	175.3	0.0	0.65
							10.0											
	STM2B	STM2C			0.00	0.78	10.4	101.9	221.0	525	0.50	73.5	0.216	0.131	1.40	304.1	0.9	0.73
							11.3											
	CB202	STM2C	0.692	0.80	0.55	0.55	10.0	104.2	159.4	375	1.00	1.5	0.110	0.094	1.59	175.3	0.0	0.91
							10.0											
	CB203	STM2C	0.560	0.63	0.35	0.35	10.0	104.2	102.4	375	1.00	1.5	0.110	0.094	1.59	175.3	0.0	0.58
							10.0											
	STM2C	STM2E			0.00	1.69	11.3	97.7	457.6	675	1.00	99.5	0.358	0.169	2.35	840.6	0.7	0.54
							12.0											
	CB204	STM2F	0.057	0.90	0.05	0.05	10.0	104.2	14.8	250	1.00	7.4	0.049	0.063	1.21	59.5	0.1	0.25
							10.1											
	CB205	STM2F	0.121	0.90	0.11	0.11	10.0	104.2	31.5	250	1.00	1.4	0.049	0.063	1.21	59.5	0.0	0.53
							10.0											
	CB206	STM2F	0.117	0.90	0.11	0.11	10.0	104.2	30.4	250	1.00	1.3	0.049	0.063	1.21	59.5	0.0	0.51
							10.0											
	CB207	STM2F	0.119	0.90	0.11	0.11	10.0	104.2	31.1	250	1.00	1.2	0.049	0.063	1.21	59.5	0.0	0.52
							10.0											
	BLDG B	STM2F	0.936	0.90	0.84	0.84	10.0	104.2	243.9	450	1.00	36.2	0.159	0.113	1.79	285.1	0.3	0.86
							10.3											
	CB208	STM2F	0.173	0.20	0.03	0.03	10.0	104.2	10.0	250	1.00	3	0.049	0.063	1.21	59.5	0.0	0.17
							10.0											
	STM2F	STM2E			0.00	2.94	14.8	84.2	686.2	750	0.50	113.2	0.442	0.188	1.78	787.2	1.1	0.87
							15.9											
	STM2E	STM2G			1.63	4.57	15.9	80.8	1025.6	900	0.50	101.3	0.636	0.225	2.01	1280.1	0.8	0.80
							16.7											
	CB300	STM2G	0.381	0.20	0.08	0.08	10.0	104.2	22.1	250	1.00	2.3	0.049	0.063	1.21	59.5	0.0	0.37
							10.0											
	STM2G	STM2H			0.00	4.64	16.7	78.4	1011.4	900	0.50	47.9	0.636	0.225	2.01	1280.1	0.4	0.79
							17.1											

Barrhaven South Urban Expansion Area Excerpts
J.L. Richards & Associates Limited

JLR No. 26610
May 4, 2018 Rev2



PROJECT:

BARRHAVEN SOUTH URBAN EXPANSION AREA

OTTAWA, ONTARIO

DRAWING:

BSUEA EXTENTS, DRAINAGE DIVIDE AND CULVERTS

J.L.Richards

ENGINEERS · ARCHITECTS · PLANNERS

www.jlrichards.ca

DESIGN:	BP
DRAWN:	KTK
CHECKED:	GF
JLR #:	26610

DRAWING #:

FIGURE 3-1

File Location: R:\26000\26610 - Barrhaven Expansion - Minto Brazeau Mattamy\JLR DWG\GIS\26610 C BSUEA EXTENTS.mxd

Plot Date: September 12, 2017 8:45:23 AM

OUTLET TRUNK STORM SEWER TO JOCK RIVER
DISTANCE FROM MH205 TO JOCK RIVER 1:100 YR FLOOD PLAIN LIMIT IS APPROXIMATELY 815 M
INVERT AT MH205 = 93.42 M
INVERT AT JOCK RIVER 100 YR FLOOD PLAIN = APPROXIMATELY 92.0 M
OUTLET SEWER = 825 MM DIA. @ 0.17 %

SUBJECT PROPERTY

CAMBRIAN RD
TO CLARK POND
TODD POND
OUTLET
FUTURE COLLECTOR RD
BORRISOKANE RD
HIGHWAY 416
TRAIL RD
EX GREENBANK RD
RIVER MIST RD
DUNDONALD DR
DES SOLDATS
RIENDEAU ST
FAMEFLOWER ST
KILBIRNIE DR
LAURALEAF CR.
BREAKSTONE RD
KNOCKADERRY CR.
ALEX PATTERSON AVE
NEW GREENBANK RD
STREET 1
STREET 2
STREET 3
STREET 4
STREET 5
STREET 6
EAST WEST COLLECTOR
PARKETTE 1
PARKETTE 2
DRUMMOND SWM POND
BRAZEAU SWM POND
DRY SWM POND
SWM DRY POND
POND 1 (NORTH)
POND 2 (SOUTH)
DRUMMOND AGGREGATE EXTRACTION AREA
BRAZEAU AGGREGATE EXTRACTION AREA
SCHOOL
PARK
COMMERCIAL
PARK & RIDE
FRENCH PUBLIC ELEMENTARY SCHOOL
FRENCH CATHOLIC ELEMENTARY SCHOOL
NEIGHBOURHOOD PARK
MEDIUM DENSITY
BARNSDALE RD
710 HDS
825 HDS
625HDS

LEGEND

- PROPOSED STORM (EES SYSTEM), PER 2018 BSUEA MSS
- PROPOSED STORM (CONVENTIONAL), PER 2018 BSUEA MSS
- FUTURE STORM, PER 2014 BS MSS
- EXISTING STORM
- DRAINAGE BOUNDARY
- LIMIT OF STUDY AREA FOR BSUEA
- 710 HDS — HYDROLOGY DYNAMIC SEPARATOR
- AREA IN HECTARES*
- RUNOFF COEFFICIENT*
- PIPE REACH UPSTREAM MAINTENANCE HOLE TO DOWNSTREAM MAINTENANCE HOLE

* IF RED, AREAS DESIGNATED AS COMMERCIAL, SCHOOLS OR PARKS

NOTE:

ROADWAYS WITHIN A DRAINAGE AREA WHICH IS TRIBUTARY TO AN EES SEWER, ARE TO BE DESIGNED WITH EES SEWERS. CONVERSELY, ROADWAYS WITHIN A DRAINAGE AREA WHICH IS TRIBUTARY TO A CONVENTIONAL SEWER, ARE TO BE DESIGNED WITH CONVENTIONAL SEWERS.

ETOBICOKE EXFILTRATION SYSTEM STORM SEWERS

Maintenance Hole Number		SEWER DATA			Upstream	Downstream
		Dia	Slope	Length	Obvert	Obvert
FROM	TO	(mm)	(%)	(m)		
DI-1	170	900	1.05	56.1	107.04	106.45
170	172	900	1.05	186.5	106.45	104.47
172	174	1350	0.30	184.4	104.47	103.92
174	176	1350	0.30	156.7	103.92	103.45
176	152	1350	0.30	161.4	103.45	102.96
150	152	675	0.15	264.6	102.30	101.90
177	152	675	0.15	237.4	102.00	101.65
152	154	1500	0.35	175.8	101.45	100.82
154	156	1500	0.55	311.7	100.53	98.82
705 (ex.)	163	525	0.42	41.5	100.82	100.65
163	156	750	0.15	118.5	100.65	100.47
156	158	1500	0.55	202.6	97.86	96.74
158	159	1500	0.55	108.1	96.20	95.60
158	158A	1500	0.95	40.0	96.74	97.13
159	159A	1500	3.54	43.0	95.60	97.13
DI-2	300	900	1.05	121.1	105.68	104.39
300	302	900	0.35	168.1	104.39	103.81
302	304	900	0.94	162.6	102.02	100.49
304	321	1200	0.15	63.3	100.49	100.39
321	322	1200	0.15	88.2	100.39	100.28
322	323	1200	0.15	75.4	100.28	100.15
323	324	1200	0.35	140.8	100.15	99.82
320	324	825	0.15	139.2	99.83	99.62
324	330	1500	0.15	183.6	99.82	99.38
330	332	1500	0.15	144.2	99.38	99.16
332	334	1650	0.15	131.1	99.16	98.96
334	336	1650	0.15	173.3	98.96	98.70
336	337	1650	0.15	168.8	97.58	97.33
337	P2-IN	1650	0.15	36.0	97.33	97.29
159	625HDS	1050	0.35	26.2	95.15	95.05
314	822	1200	0.12	160.8	95.05	94.86
314	318	1050	0.15	170.2	101.68	101.43
316	318	1200	0.15	96.0	101.43	101.28
318	364	1200	0.58	266.2	101.28	99.62
364	362	1200	0.70	88.2	99.10	98.48
362	190	1200	0.70	177.7	97.78	96.54
351	190	600	0.67	134.4	95.83	94.93
754	190	1800	0.13	15.0	94.99	94.93
190	190A	1200	0.07	30.0	94.32	94.30
190A	190B	1200	0.09	52.7	94.30	94.25
190B	755	600	0.13	15.3	93.84	93.82
110	111	450	2.70	89.4	102.90	100.49
111	112	675	0.90	101.2	100.49	99.58
313	112	525	0.74	140.0	100.60	99.56
112	710	675	1.30	73.3	99.56	98.61
112	710	675	1.30	73.3	99.56	98.61
712	711	375	2.56	104.3	102.031	99.361
711	710	450	1.32	104.4	99.407	98.027
710	720	750	0.61	118.2	98.102	97.397
753	754	1800	0.11	54.9	95.008	94.949
754	755	1800	0.13	74.9	94.939	94.839
755	822	1800	0.13	79.5	94.84	94.74
EX.822	EX.821	1800	0.14	123.1	94.07	93.90
EX.821	EX.820	1800	0.15	121.9	93.90	93.71
EX.748	EX.747	600	0.20	83.1	95.95	95.79
EX.747	EX.745	600	0.99	12.1	95.72	95.60
EX.746	EX.744	600	0.20	69.4	95.58	95.44
EX.743	EX.744	450	1.31	81.4	95.92	94.92
EX.744	EX.820	675	0.32	12.4	93.75	93.70
EX.820	EX.102	1800	0.16	121.7	93.71	93.52
270	265	1500	0.15	100.0	99.43	99.30
265	260	1500	0.15	357.3	98.00	97.47
260	245	1500	0.15	227.8	97.47	97.12
250	245	1500	0.15	345.0	97.84	97.12
245	240	2100	0.15	84.9	97.12	97.00
240	Brazeau SWM Pond	2100	0.15	241.7	97.00	96.63
Brazeau SWM Pond	235	675	0.17	37.0	95.19	95.12
230	225	1500	0.15	450.0	97.58	96.99
225	215	1500	0.15	220.1	96.99	96.66
220	215	1500	0.15	408.7	97.27	96.66
215	Drummond SWM Pond	2100	0.15	350.0	96.66	96.13
Drummond SWM Pond	210	675	0.15	25.0	94.69	94.65
235	210	675	0.17	272.0	95.12	94.65
210	205	825	0.17	223.0	94.65	94.26
205	Flood Plain	825	0.17	617.0	94.26	92.94
900	227 (ex.)	975	0.15	120.0	97.83	97.75

No.	ISSUE / REVISION	DD/MM/YY
4	ISSUED FOR PLANNING COMMITTEE APPROVAL	04/05/18
3	ADDRESS COMMENTS, RE-ISSUE BSUEA MSS 2ND SUBMISSION	26/02/18
2	ISSUED AS PART OF DRAFT MSS	20/09/17
1	ISSUED FOR PRE-TAC WORKING MEETING	31/08/17

VERIFY SHEET SIZE AND SCALES. BAR TO THE RIGHT IS 25mm IF THIS IS A FULL SIZE DRAWING. 0 25mm

SCALE: 1:4000

CLIENT:

CONSULTANT: www.jlrichards.ca

J.L.Richards ENGINEERS · ARCHITECTS · PLANNERS

CONSULTANT:

PROFESSIONAL STAMP: LICENSED PROFESSIONAL ENGINEER M. N. L. DALRYMPLE PROVINCE OF ONTARIO May 4/18

PROJECT NORTH

PROJECT:

BARRHAVEN SOUTH URBAN EXPANSION AREA (BSUEA)

-

DRAWING:

MASTER STORM DRAINAGE PLAN EES

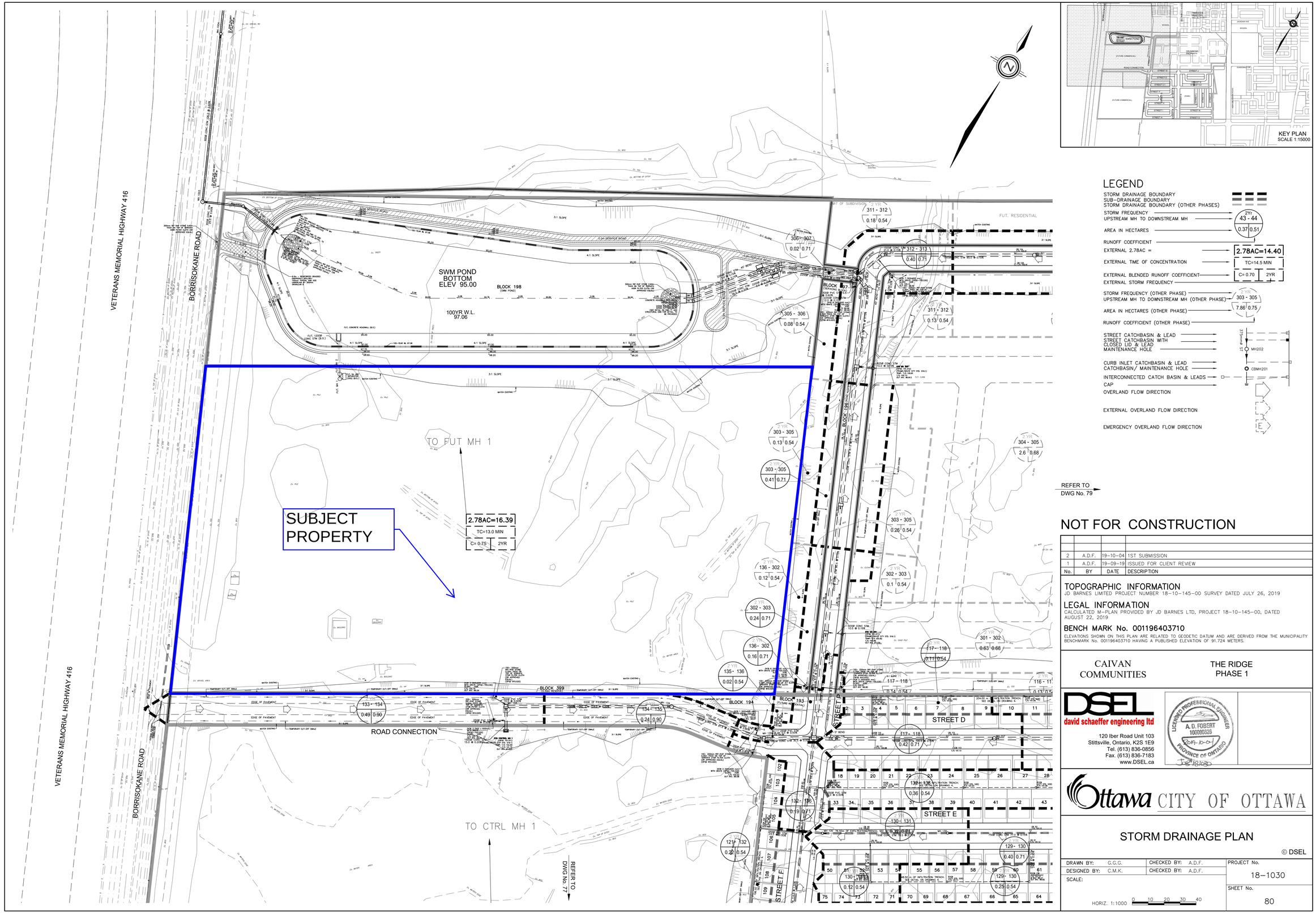
DESIGN:	JW	
DRAWN:	CJM	DRAWING #:
CHECKED:	LD	MST-2
JLR #:	26610	

PLOT DATE: May 4, 2018 8:44:19 AM

File Location: n:\26000\26610 - barrhaven expansion - minto brazeau nattamy\JLR DWG\civil\26610 C-MST-2.dwg

Design Brief for Caivan Communities
The Ridge (Brazeau Lands)
David Schaeffer Engineering Ltd.

DSEL No. 18-1030
October 4, 2019 Rev1



LEGEND

- STORM DRAINAGE BOUNDARY
- SUB-DRAINAGE BOUNDARY
- STORM DRAINAGE BOUNDARY (OTHER PHASES)
- STORM FREQUENCY / UPSTREAM MH TO DOWNSTREAM MH — 2YR: 43 - 44
- AREA IN HECTARES — 0.37
- RUNOFF COEFFICIENT — 0.51
- EXTERNAL 2.78AC = — 2.78AC=14.40
- EXTERNAL TIME OF CONCENTRATION — TC=14.5 MIN
- EXTERNAL BLENDED RUNOFF COEFFICIENT — C= 0.70
- EXTERNAL STORM FREQUENCY — 2YR
- STORM FREQUENCY (OTHER PHASE) / UPSTREAM MH TO DOWNSTREAM MH (OTHER PHASE) — 2YR: 303 - 305
- AREA IN HECTARES (OTHER PHASE) — 7.86
- RUNOFF COEFFICIENT (OTHER PHASE) — 0.75
- STREET CATCHBASIN & LEAD / STREET CATCHBASIN WITH CLOSED LID & LEAD MAINTENANCE HOLE — ST SEWER — MH202
- CURB INLET CATCHBASIN & LEAD CATCHBASIN/ MAINTENANCE HOLE — CBMH201
- INTERCONNECTED CATCH BASIN & LEADS CAP
- OVERLAND FLOW DIRECTION
- EXTERNAL OVERLAND FLOW DIRECTION
- EMERGENCY OVERLAND FLOW DIRECTION

NOT FOR CONSTRUCTION

No.	BY	DATE	DESCRIPTION
2	A.D.F.	19-10-04	1ST SUBMISSION
1	A.D.F.	19-09-19	ISSUED FOR CLIENT REVIEW

TOPOGRAPHIC INFORMATION
JD BARNES LIMITED PROJECT NUMBER 18-10-145-00 SURVEY DATED JULY 26, 2019

LEGAL INFORMATION
CALCULATED M-PLAN PROVIDED BY JD BARNES LTD, PROJECT 18-10-145-00, DATED AUGUST 22, 2019

BENCH MARK No. 001196403710
ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM THE MUNICIPALITY BENCHMARK No. 001196403710 HAVING A PUBLISHED ELEVATION OF 91.724 METERS.

CAIVAN COMMUNITIES

THE RIDGE
PHASE 1

DSEL
david schaeffer engineering ltd
120 Iber Road Unit 103
Stittsville, Ontario, K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca

LICENSED PROFESSIONAL ENGINEER
A. D. FOBERT
100090326
PROVINCE OF ONTARIO

Ottawa CITY OF OTTAWA

STORM DRAINAGE PLAN

DRAWN BY:	G.G.G.	CHECKED BY:	A.D.F.
DESIGNED BY:	C.M.K.	CHECKED BY:	A.D.F.
SCALE:			

HORIZ. 1:1000 0 10 20 30 40

PROJECT No. 18-1030

SHEET No. 80

CITY PLAN No. XXXXXX

CITY FILE No. D07-16-18-0011

DRAWINGS / FIGURES

HIGHWAY 416 SOUTH

BORRISOKANE ROAD

PROPOSED STORM POND
DESIGN TO BE SUBMITTED
AS PART OF
City File D07-16-19-0005

SIGNAGE

BERM

PAVED BASKETBALL COURT

152 REG. PARKING

PAINTED DIAG. LINES AT PAVING

ENTRY /EXIT GATE

WASTE COLLECTION (2x) SECURE RECESSED BINS W/ CONCRETE PAD

2,400 mm H. t/o FENCE ABOVE LOW RETAINING WALL

LOW RETAINING WALL

SAWDUST COLLECTION (2x) SECURED RECESSED BINS W/ CONCRETE PAD

LOADING AT DEPRESSED SLAB (3x AT NORTH SIDE)

LOW RETAINING WALL (T.O.W. = 102.85) W/ 1070 H. GALV. STEEL GUARD RAIL (TYP.)

POURED CONCRETE DOLLY PAD (TYP.)

OUTDOOR COVERED STORAGE (TYP.)

BUS PKG

BUS PKG

BUS PKG

18 BICYCLE PARKING SPACES

WATER WELL LOCATION IF REQUIRED

1 STOREY ASSEMBLY PLANT BUILDING

2 STOREY ADMINISTRATION BUILDING

1M (15 M MAX.) TO ACCESS ROUTE

FIRE DEPT. CONNECTION TO AUTO SPRINKLER SYSTEM

7 VISTR. & 2 BF PARKING

LOADING AT GRADE W/ DOCK LEVELER (3x AT EAST SIDE)

EXTERIOR EQUIPMENT SECURE STORAGE: FORK-LIFTS

POURED CONCRETE DOLLY PAD (TYP.)

LOW RETAINING WALL (T.O.W. = 102.85) W/ 1070 H. GALV. STEEL GUARD RAIL (TYP.)

SPRKLR

FIRE DEPT. CONNECTION TO AUTO SPRINKLER SYSTEM

ELEC

MAIN ENTRY

OUTDOOR COVERED STORAGE (TYP.)

GENERATOR

TRANSFORMER

2x DEDICATED OVERSIZED LOADING SPACES FOR PLANT BUILDING AND AMINISTRATION BUILDING

(3x) ELEC BOLLARDS

33 REG. & 2 BF PARKING

ENTRY /EXIT GATE ON CONCRETE PIERS

SHIPPING LOADING AREA (PAVED)

EXTERIOR STORAGE AREA (UNPAVED)

OUTDOOR STORAGE AREA 9,590 m2

SEPTIC FIELD REFER TO CIVIL ENG.

DIESEL FUEL STORAGE TANK

FRONT YARD SETBACK

SIDE YARD SETBACK

PROPERTY LINE

PROPERTY LINE

C.L. OF ROADWAY

(FUTURE ROADWAY)

C.L. OF ROADWAY

0' 10' 25' 50' 100'

No.	Date	Émis pour / Object
1	2019-10-25	COORDINATION
2	2019-10-28	COORDINATION
3	2019-10-29	CLIENT_REVIEW
4	2019-10-30	COORDINATION
5	2019-10-31	COORDINATION
6	2019-11-07	COORDINATION
7	2019-11-08	COORDINATION
8	2019-11-11	COORDINATION
9	2019-11-15	COORDINATION
10	2019-11-18	COORDINATION
11	2019-11-22	COORDINATION
12	2019-11-29	COORDINATION

Engineer / Trade Consultants (Mechanical / Electrical)

wsp

Goodkey Weedmark Consulting Engineers

DILFO
MECHANICAL | HVAC SERVICES
PLUMBING & HEATING

DRYCORE ELECTRIC · ÉLECTRIQUE

Engineer (Structural)

CLELAND JARDINE ENGINEERING LTD

Landscape Architect

NAK design strategies

Urban Planner

FOTENN PLANNING+DESIGN

Engineer (Civil)

DSEL david schaeffer engineering ltd

Owner

ABIC
ADVANCED BUILDING INNOVATION COMPANY

Architect

Collectif d'architectes / Architects Collective

fig. 1
3550, Saint-Antoine O.
Montréal QC H4C 1A9
T. 514 861-5122

fig. 2
190 Somerset St W #206
Ottawa, ON K2P 0J4
T. 613 695-6122

figurr
www.figurr.ca

Design Builder

40th BBS
BBS CONSTRUCTION (ONTARIO) LTD
1805 WOODWARD DRIVE
OTTAWA, ON K2C 0P9
CANADA (613) 226-8830 Fax: (613) 226-7709
www.bbsconstruction.ca

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Sceau / *Seal*

Note:

L'entrepreneur doit vérifier toutes les dimensions et informations sur le site et aviser immédiatement l'architecte de toutes erreurs ou omissions.

Contractor shall verify all information and dimensions on site and immediately report any errors or omissions to the architect.

Projet / *Project*

ABIC OFFICE / ASSEMBLY PLANT

3713 BORRISOKANE RD.
Ottawa, Ontario

Titre / *Title*

SITE PLAN

Dessiné par / *Drawn by*	No. projet / *Project number*	
GB,TS	*1944*	
Vérifié par / *Verified by*	No. dessin / *Drawing number*	Révision / *Revision*
RC		0
Échelle / *Scale*		
1:500		
Date de création du dessin / *Drawing creation date*		
2019-09-19		A105

TOPOGRAPHIC DETAIL

PART OF LOTS 7, 8 AND 9 CONCESSION 3 (RIDEAU FRONT)

GEOGRAPHIC TOWNSHIP OF NEPEAN
NOW IN THE
CITY OF OTTAWA

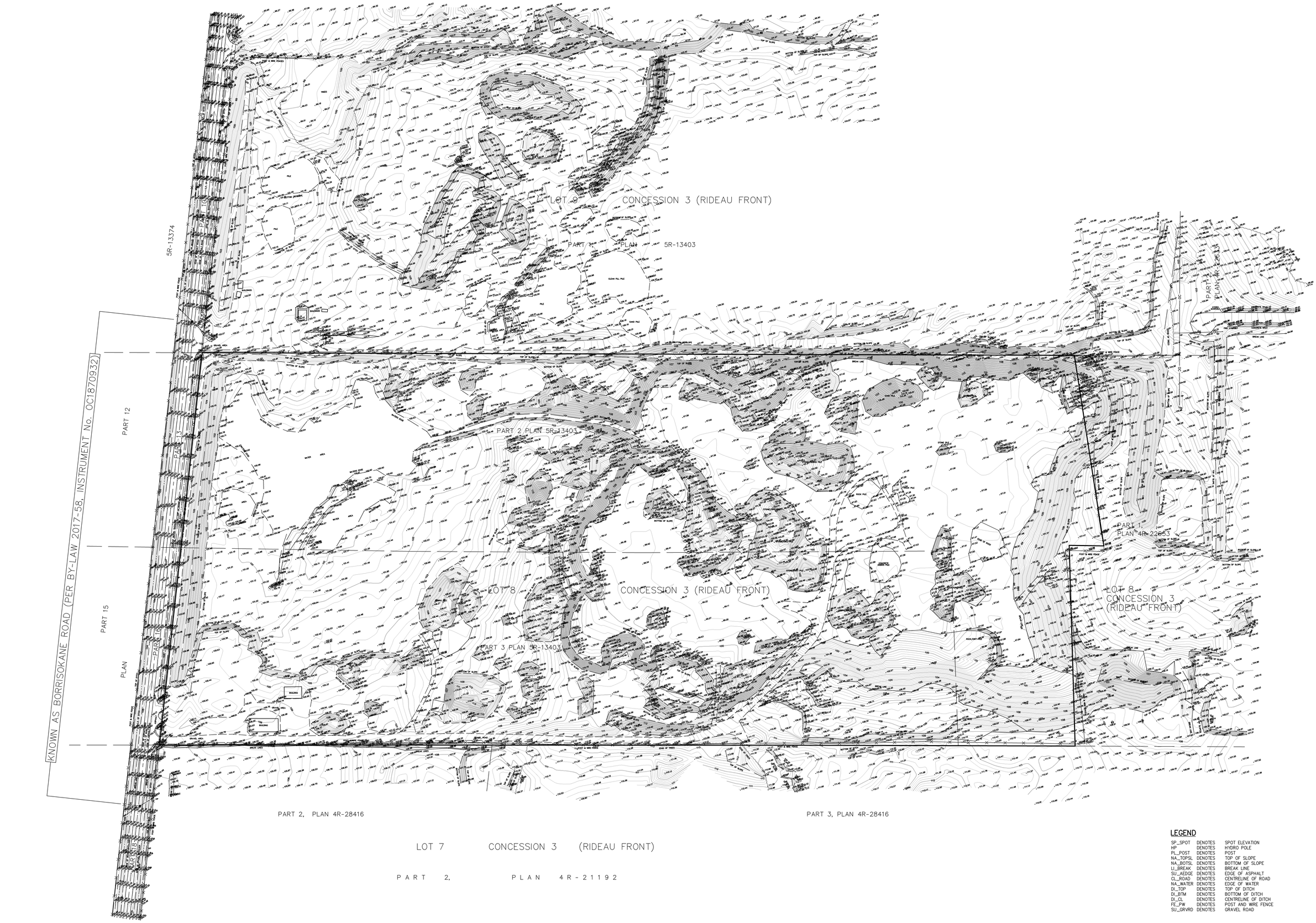
SCALE 1 : 1500
0 10 20 30 40 50 METRES

J.D. BARNES LIMITED

METRIC DISTANCES AND/OR COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

ELEVATION

ELEVATIONS ARE GEODETIC AND ARE REFERRED TO THE PUBLISHED BENCHMARK NO. 001196403710, HAVING AN ELEVATION OF 91.724 m.



LOT 7 CONCESSION 3 (RIDEAU FRONT)

PART 2, PLAN 4R-21192

LEGEND

SP_SPOT	DENOTES	SPOT ELEVATION
HP	DENOTES	HYDRO POLE
PL_POST	DENOTES	POST
NA_TOPSL	DENOTES	TOP OF SLOPE
NA_BOTSL	DENOTES	BOTTOM OF SLOPE
LI_BREAK	DENOTES	BREAK LINE
SU_AEDGE	DENOTES	EDGE OF ASPHALT
CL_ROAD	DENOTES	CENTRELINE OF ROAD
NA_WATER	DENOTES	EDGE OF WATER
DI_TOP	DENOTES	TOP OF DITCH
DI_BTM	DENOTES	BOTTOM OF DITCH
DI_CL	DENOTES	CENTRELINE OF DITCH
FE_PW	DENOTES	POST AND WIRE FENCE
SU_GRVRD	DENOTES	GRAVEL ROAD

J.D.BARNES LIMITED
SURVEYING MAPPING GIS
LAND INFORMATION SPECIALISTS
2430 DON REID DRIVE, SUITE 204, OTTAWA, ON K1H 1E1
T: (613) 731-7244 F: (613) 731-8955 www.jdbarnes.com

DRAWN BY:	CHECKED BY:	REFERENCE NO.:
NS	CF	18-10-145-00

FILE: G:\18-10-145\00\Drawing\TOPO\18-10-145-00_TOPO.dgn
PLOTTED: 7/10/2019

Revision 06/10/19

PAVEMENT DESIGN

40mm SUPERPAVE 12.5 ASPHALT CONCRETE
50mm SUPERPAVE 19.0 ASPHALT CONCRETE
150mm GRANULAR "A" CRUSH STONE
400mm GRANULAR "B" TYPE II

ANY DISTURBED AREA DURING CONSTRUCTION TO BE RESTORED TO THE ORIGINAL CONDITION OR BETTER TO THE SATISFACTION OF THE AUTHORITIES HAVING JURISDICTION

CONTRACTOR TO VERIFY THE PRECISE LOCATIONS AND INVERT ELEVATIONS OF Ex. UNDERGROUND SERVICES AND Ex. UTILITIES PRIOR TO STARTING CONSTRUCTION

NOTE: ALL EXISTING TREES, SHRUBS ETC. WITHIN LOTS, BLOCKS AND ROADS TO BE REMOVED, UNLESS OTHERWISE NOTED

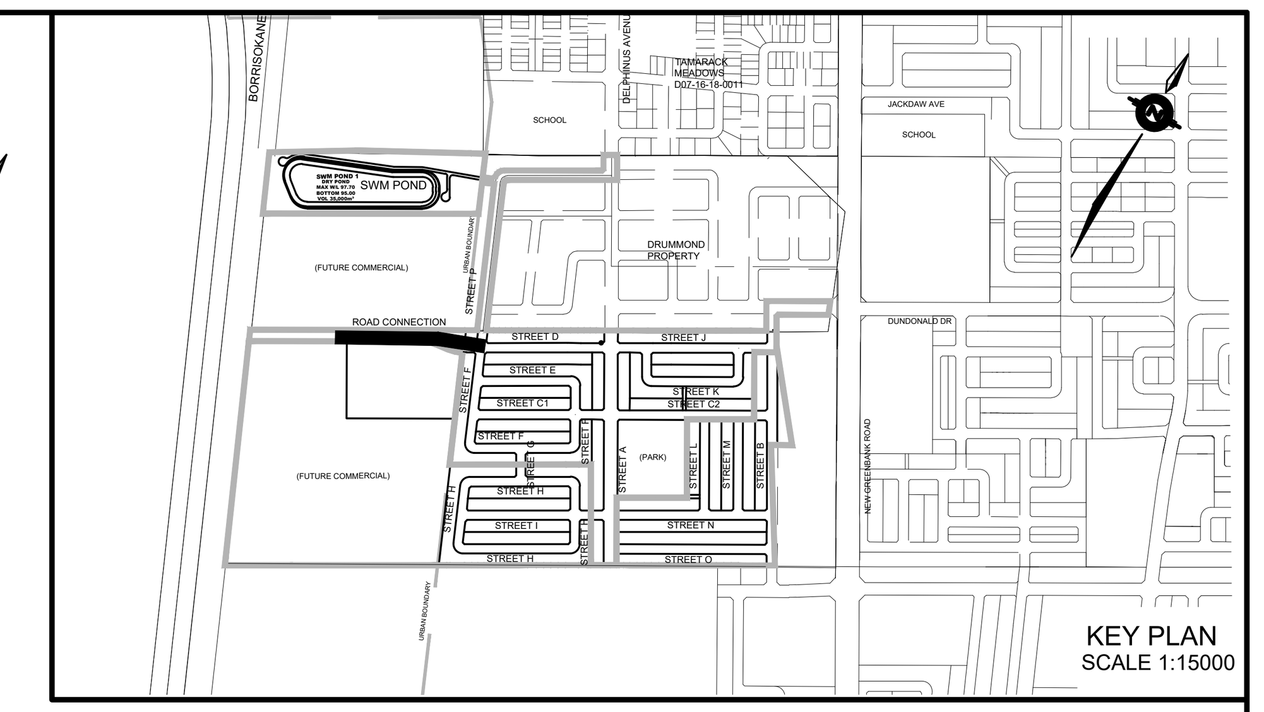
PERMISSION REQUIRED FOR WORK ON ADJACENT LANDS

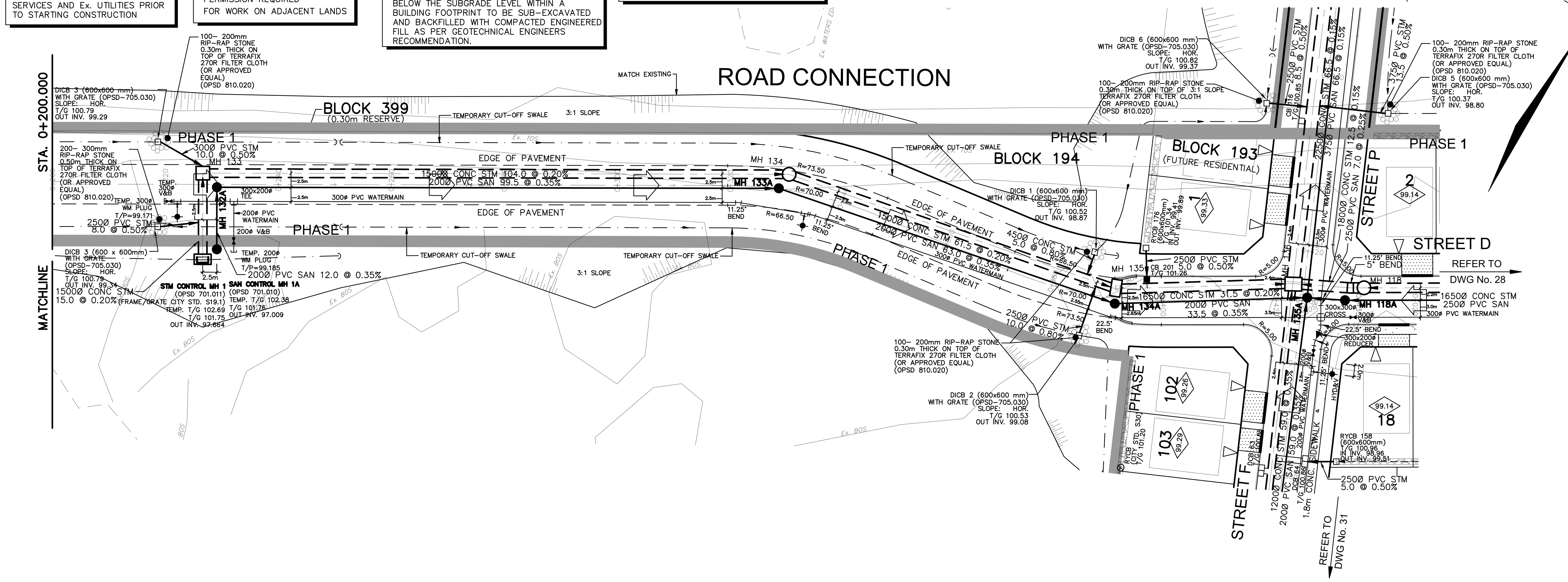
NOTE FOR WATERMAIN STUBS, 2.4m MIN. COVER TO BE PROVIDED

NOTE: RE: TEST PIT/BOREHOLE EXCAVATIONS ANY DISTURBED MATERIAL ENCOUNTERED BELOW THE SUBGRADE LEVEL WITHIN A BUILDING FOOTPRINT TO BE SUB-EXCAVATED AND BACKFILLED WITH COMPACTED ENGINEERED FILL AS PER GEOTECHNICAL ENGINEERS RECOMMENDATION.

NOTE RE: DEEP SERVICE CONNECTION FOR DEEP SANITARY SERVICE CONNECTIONS, REFER TO THE DETAIL ON DWG. 3

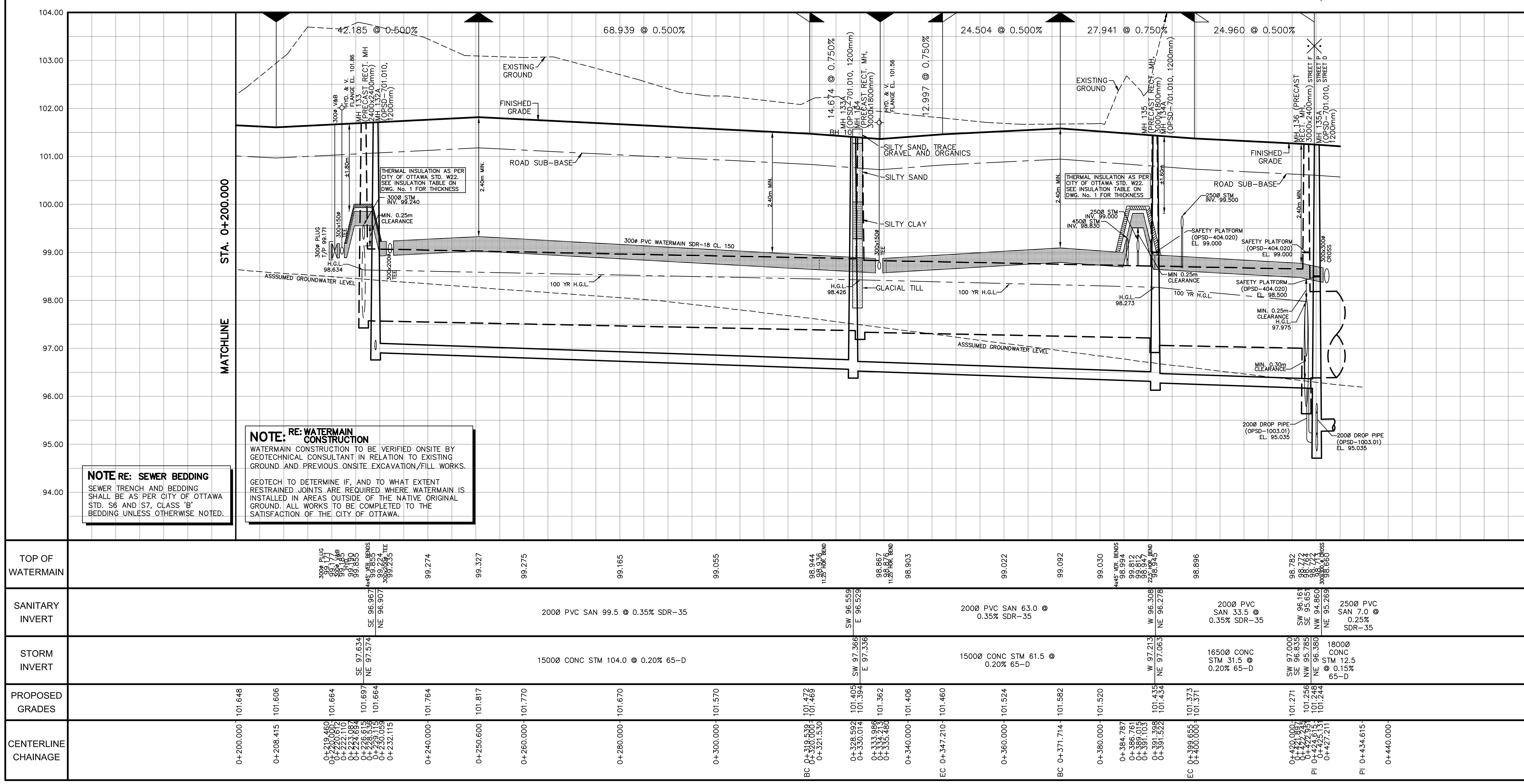
NOTE: ICD FOR ICD APPLICATION, REFER TO DRAWING No. 3 FOR DETAIL.





LEGEND

- CROSS
- 45° BEND
- LATERAL
- HYDRANT, VALVE & VB
- TEE
- VALVE & VC
- VALVE & VB
- 22.5° BEND
- 11.25° BEND
- REDUCER
- CAP
- SANITARY MAINTENANCE HOLE
- CAP
- STREET CATCHBASIN & LEAD
- STREET CATCHBASIN WITH CLOSED LID & LEAD
- STORM MAINTENANCE HOLE
- CURB INLET CATCHBASIN & LEAD
- CATCHBASIN/ MAINTENANCE HOLE
- INTERCONNECTED CATCH BASIN & LEADS
- CAP
- SINGLE SERVICE LOCATION (ST, SAN & WM)
- SINGLE SERVICE LOCATION (SAN & WM)
- SINGLE SERVICE LOCATION (ST, SAN & WM)
- TEE CATCHBASIN
- PERFORATED PIPE
- ELBOW CATCHBASIN
- DITCH AND CULVERT
- HYDRO TRANSFORMER
- STREET LIGHT STANDARD
- CONCRETE SIDEWALK
- CURB & DEPRESSED CURB
- ASPHALT SIDEWALK
- CHAINLINK FENCE (1.5m UNLESS OTHERWISE NOTED)
- NOISE BARRIER (2.5m UNLESS OTHERWISE NOTED)
- DECORATIVE FENCE (SEE LANDSCAPE DWGS FOR DETAIL)
- CONSTRUCTION FENCE
- POST AND RAIL FENCE
- PHASING LIMITS
- PROPERTY BOUNDARY
- BOREHOLE (BH)
- TEST PIT (TP)
- AUGER HOLE (AH)
- MONITORING WELL LOCATION
- CONCEPTUAL WELL LOCATION
- (BOREHOLE TO CONCEPTUAL WELL LOCATION: AS PER GEOTECHNICAL REPORT)
- TOP OF FOUNDATION ELEVATION
- FINISHED FLOOR ELEVATION
- UNDERSIDE OF FOOTING ELEVATION
- NUMBER OF RISERS
- UNITS REQUIRING PRESSURE REDUCING VALVES
- WALKOUT UNITS
- SLAB ON GRADE
- OVERLAND FLOW DIRECTION
- EXTERNAL OVERLAND FLOW DIRECTION
- EMERGENCY OVERLAND FLOW DIRECTION
- TACTILE WALKING SURFACE INDICATOR (AS PER CITY OF OTTAWA STD. SC6, SC7, SC7.1, SC7.2, SC7.3)
- PREVIOUS PHASES
- CLAY SEAL (REFER TO GENERAL NOTES. No. 18. ON DWG. No. 1, AND GEOTECHNICAL CONSULTANT'S SPECIFICATIONS)
- MIN. USF AS PER GEOTECHNICAL CONSULTANT'S RECOMMENDATION



NOTE: RE: WATERMAIN CONSTRUCTION
WATERMAIN CONSTRUCTION TO BE VERIFIED ONSITE BY GEOTECHNICAL CONSULTANT IN RELATION TO EXISTING GROUND AND PREVIOUS ONSITE EXCAVATION/FILL WORKS.

GEOTECH TO DETERMINE IF, AND TO WHAT EXTENT RESTRAINED JOINTS ARE REQUIRED WHERE WATERMAIN IS INSTALLED IN AREAS OUTSIDE OF THE NATIVE ORIGINAL GROUND. ALL WORKS TO BE COMPLETED TO THE SATISFACTION OF THE CITY OF OTTAWA.

NOTE RE: SEWER BEDDING
SEWER TRENCH AND BEDDING SHALL BE AS PER CITY OF OTTAWA STD. S6 AND S7, CLASS 'B' BEDDING UNLESS OTHERWISE NOTED.

NOT FOR CONSTRUCTION

No.	BY	DATE	DESCRIPTION
2	A.D.F.	19-10-04	1ST SUBMISSION
1	A.D.F.	19-09-19	ISSUED FOR CLIENT REVIEW

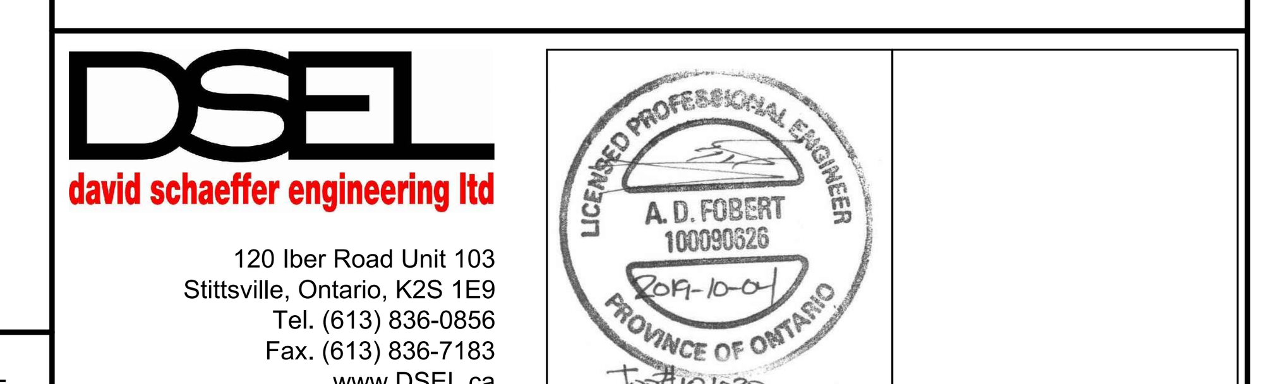
TOPOGRAPHIC INFORMATION
JD BARNES LIMITED PROJECT NUMBER 18-10-145-00 SURVEY DATED JULY 26, 2019

LEGAL INFORMATION
CALCULATED M-PLAN PROVIDED BY JD BARNERS LTD, PROJECT 18-10-145-00, DATED AUGUST 22, 2019

BENCH MARK No. 001196403710
ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM THE MUNICIPALITY BENCHMARK No. 001196403710 HAVING A PUBLISHED ELEVATION OF 91.724 METERS.

CAIVAN COMMUNITIES

THE RIDGE PHASE 1



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Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca

Ottawa CITY OF OTTAWA

PLAN AND PROFILE OF

Road Connection

(STA. 0+200.000 TO STA. 424.615)

DRAWN BY: G.G.G.	CHECKED BY: A.D.F.	PROJECT No. 18-1030
DESIGNED BY: C.M.K.	CHECKED BY: A.D.F.	
SCALE: VERT. 1:50 / HORZ. 1:500		SHEET No. 52

CITY PLAN No. XXXXXX

CITY FILE No. D07-16-18-0011